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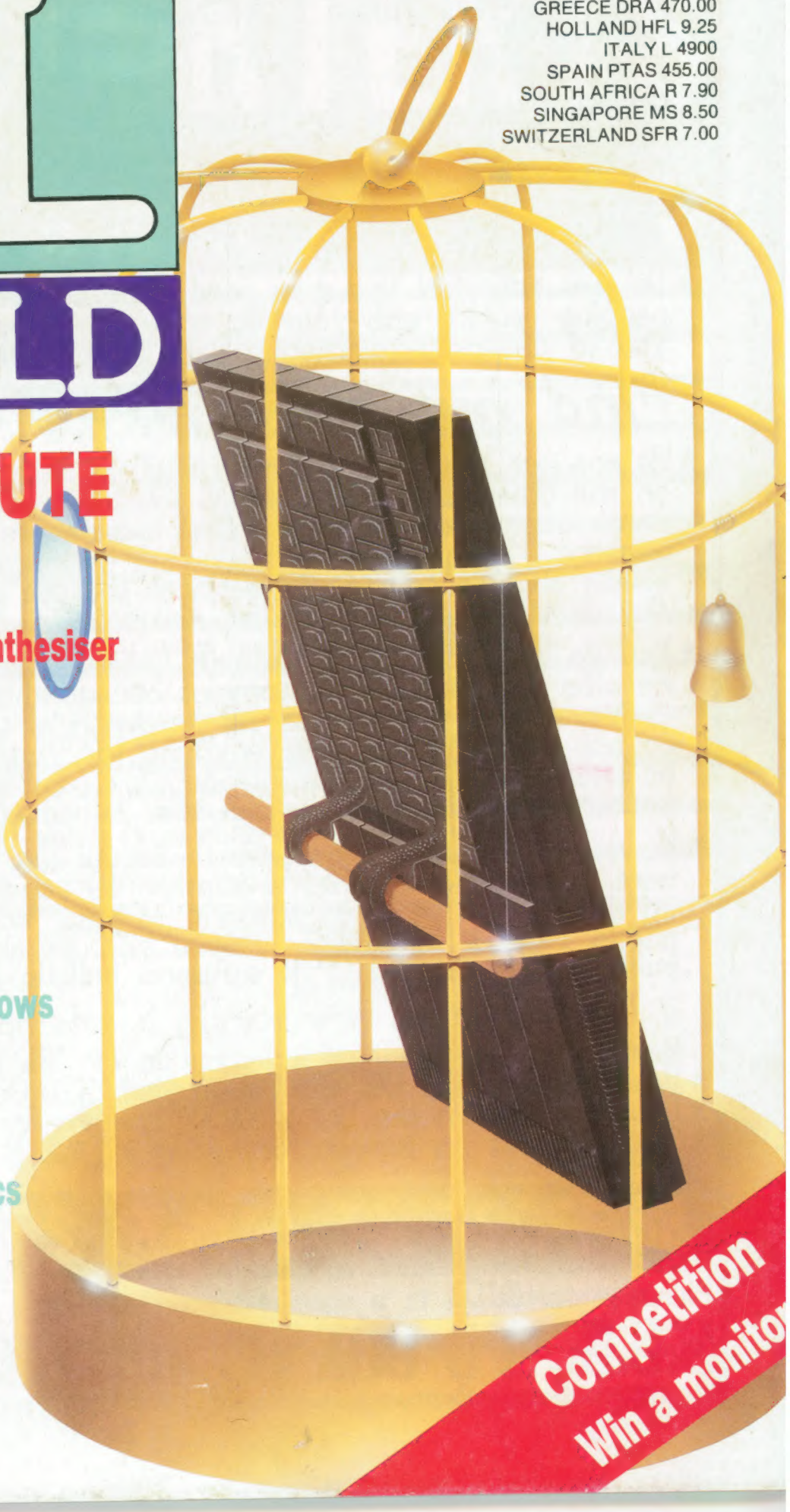

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IMPORTANT ANNOUNCEMENT: Please check the Open Channel page if one of your programs has appeared at any time in the Microdrive Exchange.

NEXT MONTH

RETURN OF THE ROMS
Simon Goodwin follows up his 1987 article on the QL ROM bugs with another eleven bugs.

SUPERBASIC
The fourth and final part of Mike Lloyd's 3D graph programming suite.

COMPUTERS

QL JS 2.3 software	£169
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Centronics Interface	£29.00

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Assembly lang. Programming	£9	Inside QDOS	£20
QL Advanced Programming	£15	QL Service manual	£20

Other QL titles available - phone for details -

☆ SPECIALS ☆

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QL SCENE

DTP PACKAGE from Sector

Sector software has released a new desk-top publishing package, *Page Designer 2*. The program can work on up to nine pages at a time and multitask with *Taskmaster* and MQRam. Page sizes can be up to 3,840 by 1,600 pixels and the program can read from Quill — Doc files as well as ASCII text files and —lis files.

There are 42 fonts, with a font editor, hi-res font editor and pattern generator, as well as all the usual features expected of a desk-top publisher. The program is avavailble on disc or on five Microdrive cartridges for £35.

Following soon is an image processor which brings computerised image enhancement to the QL by tidying digitised images. The computer can take an image and turn in into a cartoon which can be used as clip art for Page Designer 2.

System requirements for Page Designer 2 are a QL or Thor with at least 256K of memory expansion — 384K in all — and a disc interface. The modular version on Microdrives allows users without discs or with Sinclair/MP discs to use the program.

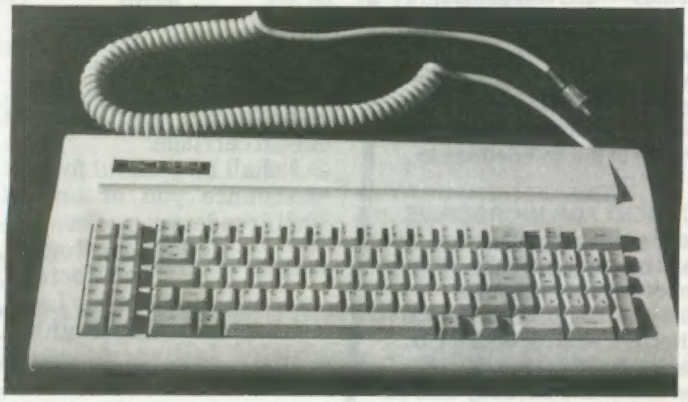
For more information, contact Sector Software at 39 Wray Crescent, Ulnes Walton, Leyland, Lancashire PR5 3NA. Tel: 0772 454328.

Schön's new Eprom fixes QL keyboard bounce

Schön has good news for good users of its standard keyboard upgrade. Some owners have been experiencing key-bounce, a phenomenon that appears on some QLs and not others. Schön have come up with a solution. For £6 Schön keyboard owners can acquire an anti-bounce device which comes in the form of an Eprom.

This device delays the keyboard scanning time and prevents key repeat problems. It could also be used on conventional keyboard if bounce is a problem.

Schön has also dropped the price of the Standard keyboard down to £45.



The Schön PC Keyboard has been refined further by having wider full touch keys fitted as standard.

As the picture shows, the key layout is tidier and easier to use. Further details on the anti-bounce device from Schon Keyboards, 15 Northcote Crescent, West Harsley, Surrey, KT24 6LX. Tel: 04865 3836.

Adventures

QL Adventurers' Forum, an adventurers' magazine on Microdrive, is now into its second issue, which is available from the publisher, Richard Alexander, Cwm, Gwen Hall, Pencader, Dyfed, Wales SA39 8HA. Tel: Pencader 574.

Copies of issue one and two are available for 50 pence each and a blank formatted Microdrive — minimum 210 sectors — or 5.25in. disc — minimum 240 sectors — and a stamped self-addressed envelope, or overseas for one international postal reply coupon and a self-addressed envelope.

QL Adventurers' Forum contains news, reviews. articles, solutions, letters and other features as Quill files. It can also be supplied, Alexander says, "as paper, if you must."

Super-duper Charger

Digital Precision is issuing a new upgraded version of the Supercharge SuperBasic compiler, called *Special Edition*. Described by Digital as the definitive and final version," Special Edition Supercharge features fast-running generated code and no Lenslok. The new version of the package costs £29.95, half the price at which the earlier version was published.

"Turbo remains the top-of-the-line SuperBasic compiler but Special Edition Supercharge is ideal for those on a budget or without an expansion RAM," says Freddie Vaccha of Digital Precision.

Digital Precision, 222 The Avenue, Chingford, London E4 9SE. Tel: 01-527 5493.

OPEN CHANNEL

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

Knot in credit

What really prompted me to write was the mention of the Brother HR-5 in two letters in the January 1988 Open Channel. Until I read them, I firmly believed I might be the only person in Britain with one of the machines, as mine was obviously imported from Germany, manual and all.

If anyone is having problems with the machine because of printing tape getting in a knot if you attempt to print more than 30 columns, may I suggest a tube of superglue and three slivers of plastic cut from an old credit card? Two of them should be fixed, one either side of the printing head, in such a way as to hold the tape firmly in position while allowing it to be manipulated in and out during cassette change.

The tape should then be run between the travelling spindle and the main body of the spindle and again retained in position by the third sliver of plastic secured horizontally to the main body of the spindle so as to allow the tape to be manipulated in and out when necessary.

Given those modifications, I have found the printer to be almost 100 per cent reliable, even over 80 columns, and amazingly versatile for such a low-priced machine.

Chris Pickles,
Edmonton,
London.

Printer diver

I have a Brother HR25 printer, a sturdy machine which generally makes a good job of the work I need to do with it, but I am experiencing problems obtaining a reasonable printout of Microdrive Directories. If I use the following listing I get an elongated list instead of a verticle one, can you help me please?

```
100 OPEN #5,ser1
110 DIR #5,MDV1—

THE
   LIST
      LOOKS
         LIKE
            THIS
               WHICH
```

is not very satisfactory, especially as the HR25 has a 13.2in carriage.

I shall be grateful for any assistance you or any of your readers can offer.

Rev Frank Rogers,
The Rectory,
3 Moor Lane,
Leasingham,
Sleaford,
NG34 8JN.

Screen cram

I am writing for the information of other QL users who have a Ferugson TX TV/monitor with RGB input. I rent my set from Radio Rentals for use with my QL and I found that it could not display all 85 characters.

I learned, however, from an electronics engineer that an add-on is available, manufactured by Thron EMI, which reduces the bandwidth of this set to allow full display when used with a QL.

I enquired at a Radio Rentals showroom and ordered the part. When it arrived one of its technicians fitted it to the set. The fitting is fairly simple but it would be advisable to have an electrician to fit it.

When in use the width reducer is switched on or off as required for either TV/use for lesser computers, or for the QL. The cost is £2.88.

I hope that this is of use to other readers since I believe that this matter has cropped up in the past as a technical query.

Brian Coutts,
East Kilbride.

QL friends

In my letter in February's issue I said I would like to form some kind of club, perhaps calling it QL User Friendly Group," so that we could keep in touch with each other.

I have now replied to many of the letters I received and hope to get things going as soon as possible.

W. G. Johns,
12A Wenallt,
Dolgellau,
Gwynedd,
North Wales LL40 1PW.

Editor's comment: Let us know how you fare.

Editor's notebook

THIS month SuperBasic concludes its four-part 3-D programming project, DIY Toolkit adds a routine to examine window settings from SuperBasic, and Ron Massey looks at QTalk, the advanced speech synthesiser from New Zealand firm Maxtronics — and two games, also by Maxtronics.

And here, at last, is the Competition: QL Artist of the Year. When QL World ran an art competition in 1986, the standard of entry was impressive — what less would we expect from people with the discrimination of QL users? This time we are tying the purpose of the competition to promoting the QL.

An IMPORTANT ANNOUNCEMENT FOR MICRODRIVE EXCHANGE AUTHORS: would the following please contact QL World within 28 days regarding royalty payments, after which we cannot be responsible for chasing them: R. Cross, S. Deary, M. Capp, P. J. Smith, Alan Prior, Karl Jeffrey, J. P. Hartley, K. B. G. Judson, D. Carmona, H. Pendry, K. Cameron, P. Etheridge, B. Otridge, Neil Davidson, Simon Quinn and anybody else on the MDX who has not heard from QL World recently.

Those who know MDX authors, please draw this to their attention. This is money we are trying to press upon them!

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The Program for Everyone

LIGHTNING is a magic wand utility which drastically increases the QL's efficiency by achieving output speeds that Sinclair Research should have engineered into the QL in the first place. Once Lightning is loaded, you can forget about its existence as it sits quietly in the background - Lightning will enhance whatever runs on your machine: from the standard Psion packages to your latest whizz-bang utilities, either one program at a time or six dozen running concurrently! Lightning works its magic by intercepting and rerouting certain accesses to the QL's ROM routines and tables. Lightning's operation is entirely transparent to you, placing no restrictions whatsoever on what you do with your machine.

The wonderful thing about Lightning is that it does not require you to know anything at all about your QL, its workings or programming in order to reap all its benefits. Lightning is so simple and easy to use that we debated over naming it after the gentleman whose meeting with the pieman is immortalised in rhyme! A truly egalitarian piece of software, Lightning aids the beginner, the casual user and the expert alike.

Incorporate Lightning once and for all into your boot procedure on your existing cartridges or disks (we'll tell you how to do this) and then forget all about it. The only evidence that your QL has been liberated will be the racing car sensation of superb screen text acceleration, smooth graphics handling and ever-so-fast computational speed. To call the effect of Lightning phenomenal would be a shocking understatement - Lightning is blinding and electrifying.

Here are some of the things that Lightning will do for you:

○ All text and user-defined graphics output to the screen in the common csizes will be speeded up markedly, on average by an amount well in excess of what Speedscreen (the only other program attempting to achieve some of Lightning's improvements) can manage: speeds in excess of 200 percent of that program can be easily demonstrated. Indeed, the demo program supplied with Speedscreen is an embarrassingly favourable display of the very considerable speed superiority of Lightning. Speedups of upto 14x over BASIC are possible: 40%-60% speed improvements over Speedscreen (no slouch itself) are typical.

○ Correspondingly, cursor-handling, scrolling and screen housekeeping are very fast with Lightning, making the software you use zippier, more responsive and much more keyboard-friendly.

○ Compatibility? No sweat -

a) Lightning accelerates all colours and stipples for INK and STRIP (not just 25 percent of these cases).

b) Lightning will not crash if your window is either too narrow or too shallow to accept input.

c) Lightning will not misbehave on any pixel alignment of a character.

d) Lightning will work correctly with OVER1 and CSIZE 1,0 - no requirement by us for (any of) white ink or black paper or non-word aligned positioning in the programs you run.

e) Lightning is fully compatible with everything we could get our hands on - no more dots on Quill or "explanations" about QRAM.

f) Lightning handles end-of-line codes exactly as does QDOS: there is never any deviation.

g) Lightning works perfectly with m/c programs that change MODE, and with BASIC/compiled ones that use NEW/LOAD/LRUN.

We could go on. We think we've made our point.

○ In all applications where text output is more than a full window, speed can be further improved by scrolling several lines (up to the whole window) at once, rather than line-by-line. Variation of scrolling speed so as to match your rate of reading is easy as pie.

○ The speed of CLS is improved dramatically, not only for a whole window, but for all of the five CLS variants. Lightning wins again, 5-1.

○ Graphic screen output is greatly accelerated by rewriting the QDOS routines for points, lines, arcs, circles and ellipses to optimise computation speed. QUADRUPLINGS of speed are hereby accomplished, again without any modification to, interference with or knowledge of the program(s) you are running - the magic wand does its work silently in the background. The other accelerating program gives no speed improvement whatsoever in these areas - graphic output is ignored by it - nor does it offer any of the exciting features detailed hereafter.

○ All the advanced mathematical functions (sine, cosine, tangent, cotangent, the four inverse functions, square roots, logarithms and powers of e as well as x raised to y) have been rewritten so as to work much faster. You will be amazed at the number of programs that rely on such calculations - it's not just the ones that use graphics. Resultant speedup for number-crunching algorithms is over 200% without loss of accuracy. In many applications nine digit accuracy is unnecessary: in these cases further acceleration in steps (you choose) up to THIRTY times the QDOS speed may be selected, with small loss in accuracy. Please note that you do not need to know anything about the internal workings of the programs you are running to use this feature - Lightning is a magic wand. Knowledge of incantations is wholly unnecessary!

○ If you wish to toggle screen output on and off (say, when going through an utterly boring hex file), Lightning will happily accommodate you. You may race through the program at considerable speed, all screen output disappearing down a drain until you command otherwise - speedups of 100x are easily achieved here! The keypress required (default: CTRL+0) is, of course, user-configurable.

○ For even greater versatility in dealing with unwanted output (such as politicians pronunciamentos, perhaps), a null device has been added. At last there is an easy way to implement switches for the selection or deselection of printer/screen output in your SuperBASIC programs:
IF a$=='y': OPEN #3,Ser1: ELSE: OPEN #3, nul

○ For compulsive knob twiddlers, text/cursor, scrolling, graphics and math functions are all optimised by independent keyword toggles.

The manual is up to Digital Precision's usual exacting standards in every respect. If it is noticeably shorter than others, it is because Lightning, your magic wand, does most of its work automatically without your ever having to learn or look up a difficult point. The Norse god of Lightning being Thor, similar miracles are performed for that computer.

There are two versions of Lightning. When you order, we will supply you with both versions: the regular version with every feature we could think of, and a compact version for use if/when RAM is very short. Of course, both versions fit quite happily onto a standard QL, and both will very happily co-exist with the popular operating environments. Needless to say, Lightning is fully compatible with Turbo, Supercharge Special Edition and other compilers (and near-misses). Note that the 5x-14x acceleration given by Lightning is in addition to any compiler's acceleration. Hesitant Speedscreen owners - send us your manual to qualify for a £5 introductory discount on Lightning.

With Lightning we don't just take the brakes off your QL - we hit the accelerator pedal, hard. There's no 70mph limit. If you don't think your budget stretches to a Cray - perhaps even if you do - get Lightning. Now. At its ridiculous price of £29.95, before DP wakes up and hikes it to a more sensible level!

The program that puts go-faster stripes on your QL – automatically

The time has come, we at DP have realised, to talk of many things: of tasks and sprites and error traps, of dataspace and strings. The (laudable) aim is to provide the readers of these pages with directions across them. After all, we don't want you to miss programs you'd benefit most from just because all the others are so fascinating. Well, then, here is a classified listing:

Operating systems and languages:
BETTER BASIC, DIGITAL C, IDIS, SUCCESS, SUPERCHARGE, SUPERFORTH, TURBO
Graphics:
DESKTOP PUBLISHER, EYE-Q, LIGHTNING, SPRITE GENERATOR, ULTRAPRINT, 3D PRECISION
Text Enhancement:
DESKTOP PUBLISHER, EYE-Q, LIGHTNING, THE EDITOR, TURBO, ULTRAPRINT
Debugging:
BETTER BASIC, PROFESSIONAL ASTROLOGER, SUPERCHARGE, SUPER MEDIA MANAGER
Toolkits:
IDIS, LIGHTNING, TRNASFER UTILITY, TURBO, 3D PRECISION
Fun (of course, the rest are fun too):
BLOCKLANDS, DROIDZONE, SUPER ARCADIA, SUPER BACKGAMMON
Leisure:
MICROBRIDGE, PROFESSIONAL ASTROLOGER, PROFESSIONAL ASTRONOMER, SUPER ASTROLOGER, SUPER BACKGAMMON, SUPER REVERSI
We'll be happy to send you, absolutely free, our Review Digest, a collection of all the independent reviews of our products that we could lay hands on, as well as a 52-page Product Brochure, which contains details of our prize draw. Don't hesitate to ask for either or both.

TURBO v2.0

The ultimate, definitive SuperBASIC compiler, used in dozens of professional programs, unbeatable for speed, conciseness, reliability, user-friendliness and bells and whistles.

○ **Speed:**
Benchmarks never tell the whole story (say the sour-grapes specialists), but the story they do tell in Turbo's case is mighty impressive.
Speedup factors (Turbo over SuperBASIC) in Personal Computer World.

Benchmarks	1	2	3	4	5	6	7	im	rm
	34x	60x	40x	51x	40x	37x	41x	69x	22x

All this on mere default settings (FREEFORM)! Change the settings to structured on a well-written program and these values will be further enhanced. Longer programs will show much higher speed-up rates. The compilation speed is more than twice that of any pseudo-compiler and the execution speed of speed-optimised Turbo code has been shown to be at least 230% of QLiberator's (not our benchmarks, but their's) and frequently more than ten times faster. 100x over BASIC is common.

○ **Conciseness:**
Turbo is a space-saver: compiled code is more concise than QLiberator's even without the space optimisation option, which will bring a further 40% enhancement. Compiled code is shorter than interpreted anyway.

○ **Reliability:**
The number of bugs in SuperBASIC is, alas, higher than it should be (write for our free list). Turbo gets rid of the worst of them and still manages to be fully compatible with the interpreter. Develop your programs making maximum parallel use of interpreter and compiler.

○ **User-friendliness:**
The front end has been newly-developed for maximum ease of use. If you want to optimize your program beyond what the default settings offer you, you are given control over code address size (16 or 32 bits), object code size (up to 64K or beyond), optimisation for speed or space (on a line-to-line basis if you wish), treatment of line numbers, diagnostics, display source format (freeform or structured), treatment of local strings, presence of QRAM environment, number of windows to copy from SuperBASIC, medium, filename, taskname and dataspace of the object program, buffer size, format of listing (window size and location), colours, sound, pause after errors/warnings on/off), compiler residency etc. A full Auto-corrector is incorporated, showing where the structure of a BASIC program went wrong and suggesting a correction (a faulty program might 'run' under the interpreter, but give wrong results the first time it was used, or crash on the tenth, or perform differently on occasion, or work on one interpreter version but not another).
- Both the compilation and execution of your compiled programs can be aborted at the touch of a key.
- Turbo is fully Thor, QRAM and Lightning compatible.
- Huge A4 manual including lucid tutorial and well-structured reference sections (full cross-referencing provided).
- No copy protection or royalty restrictions.

○ **Bells and whistles:**
Includes an extremely powerful toolkit with over 200 new commands (listed in Dec '87 QL World) and functions for use in your BASIC or compiled programs, or as direct commands (about half in machine code and half in compilable Super-BASIC), far beyond what is needed for compilation. Among the new features enabled by Turbo and its toolkit:
- virtual arrays (i.e. arrays of sizes exceeding QL memory)
- rubber arrays (i.e. redimensioning of arrays without losing data)
- integer FOR loops plus integer and string SELect structures
- Commands to prevent I/O errors caused by illegal keyboard input or microdrive/disk problems
- nine digit output accuracy
- reliable error-trapping (WHEN_ERROR)
- random binary file access
- full task control and two-way communications including pipes between tasks and sharing of variables, arrays, functions and procedures
- superfast memory search/copying/spooling
- parameter passing by value or by reference - your choice
- routine names allowed as parameters
- separate compilation of modules with superb interaction between them, permitting the building-up of routine libraries.

SUPERCHARGE SPECIAL EDITION

NEW !

Supercharge was the first SuperBASIC compiler for the QL and took everyone's breath away at its launch. Ever alert to the possibilities of the QL, Digital Precision has since gone ten better with Turbo, the ultimate BASIC compiler. Now, DP proudly presents the all-new Special Edition Supercharge, with all of the features of the original Supercharge plus:
- SE Supercharge is supplied without lenslok.
- SE Supercharge has been speed-enhanced so that it now runs at a full two-thirds of Turbo's speed – 50% faster than the original Supercharge.
- SE Supercharge will allow larger programs to be compiled without modularisation on an unexpanded QL than does Turbo (on the expanded QL, Turbo wins easily) and is pleasantly discipline oriented!
- SE Supercharge is now available at the ridiculously low price of £29.95 - less than half of Supercharge's previous cost.

So if you can make do with a little less power for a lot less money, or indeed if you feel ever so slightly timid about using the extremely powerful Turbo without first test-driving a stepping-stone (we can mix our metaphors with the best of them), SE Supercharge may well fit your bill.

THE EDITOR v2.05 / v1.17

The Editor is the most comprehensive and useful text handling system for the QL and the Thor. It will deal with:
- characters (including foreign and non-printing ones, inventing a mnemonical display for the latter)
- words (you define whether you want a particular character to be a word delimiter: this can be different for word-search and word-wrap purposes)
- lines (all the usual forms of margins, tabs and justification will be found, and a few unusual ones too)
- sentences (if you want more than a single space after a full stop, the Editor will recognise and respect your wish when reforming lines)
- columns (multi-column work is supported)
- paragraphs
- screens
- blocks (character-, column-, or line-delimited)
- pages
- whole files (pure text documents, say programs in SuperBASIC or any other language, as well as text with control characters, e.g. Quill documents and pure binary files).

Of course all the commands you could possibly expect from a text editing system are present - over 200 (listed in Dec '87 QL World) of them. The most commonly used commands are available by direct keypress too. In their extended form, they comprise an absurdly easy-to-use command language, thus permitting the construction of iterative command files (like macros, but with knobs on) for frequently used sequences - for example automatically invoked boot-up sequences for the Editor itself, or supra-commands to simplify and accelerate your work.
The Editor's speed is sensational: all operations are performed faster than by Quill, indeed some over 200 times as fast. The Editor will happily multitask with the SuperBASIC interpreter or - RAM permitting - with any executable tasks (running multiple copies of the Editor is a good idea for comparing and processing slightly different versions of the same file).
There are dozens of default settings for you to ignore if your needs are simple, or else to alter either semi-permanently (with a user-friendly configurator) or ad hoc from the running program. Among these defaults are screen size and possition, character size, start-up modes and margins, maximum line length, the cursor column position for horizontal scrolling to occur, the maximum number of simultaneous search strings examined AND-wise or OR-wise, etc.).
Like the Editor itself, the supplied printer driver beats all records for versatility. You can adapt it to your every need e.g. for multi-line headers and footers, for control characters to permit every font and type of emphasis your printer can handle, every paging convention etc.
Supplied with the Editor is a dedicated program that allows very easy conversion from Quill_doc format to pure ASCII (i.e. Editor format).
The Editor comes in two sizes: v1.17 for any QL and v2.05 (the Special Edition) with extra power through 80 additional commands for Thor computers and for QLs with at least 128K RAM expansion.
Each version has its own pellucidly clear and comprehensive manual, including a detailed index, and its meticulously laid out Help screens.
The rumour that the Editor's aim is to liberate you from the drudgery of composing your own texts and to do it all automatically isn't true. Editor won't do your writing for you, but by freeing your mind from the hassles associated with other text processors, it may seem to do so.

DESKTOP PUBLISHER

Desktop Publisher is a comprehensive desktop publishing system for any QL with at least 256K expansion RAM.
An even faster and more user-friendly Special Edition Desktop Publisher for QLs with at least 512K RAM and a disk drive is also available, as is an equally powerful variant for the Thor. Either will extend the power of Desktop Publisher far beyond anything available for computers well above the QL's price bracket. For a full feature list, refer to the Dec '87 issue of QL World.
Desktop Publisher works best with Editor and Eye-Q and is supplied with a free copy of Gralix (the excellent PDQL graphic output program).
We've kept the copy short on this one - a picture's worth a thousand words (96000 bytes actually). If you want an idea of the quality that can be achieved with dtp - take a look at this ad!

PROFESSIONAL ASTROLOGER v1.5

The world's best astrology program.
Astrology is one of the subjects that tend to produce arguments which in their turn tend to produce heat rather than light. Too few people, we think, will take a scientific attitude and examine the evidence – including self-obtained evidence – for and against planetary influences on humanity.
Professional Astrologer is a tremendously elaborate program (the user-adjustable text files alone cover 300K on microdrive or 450K on disk) that will give both the believer and the sceptic his due. It will, given the place and time of a person's birth, produce upto 10 A4 pages (you choose how many) of personality and character delineation, as well as 6 A4 pages of personalised day-to-day and year-to-year predictions. 3 A4 pages of text are output in a comparison between two people. Translated for the cognoscenti: interpretations for transits, progressions and synastry are supported.The program features individually adjustable orbs, eclipses, closing aspect indication and rectification. No previous knowledge of astrology is assumed, but the interested will find the concepts, methods and tenets of astrology lucidly explained (avoiding difficult words such as tenets). Professional Astrologer is based on the most accurate astronomical data of any microcomputer program (time: to one minute per century for this century; positions: sometimes bettering published ephemerides) and caters for all the major schools of astrology, 7 house systems in all. Its speed (<0.5 seconds per computation) has to be seen to be believed (but then it has been compiled with Turbo).
For those who want to test astrological predictions against what they know of some famous men and women, 158 birth data files are included in the package and await your additions. File compression is supported. Glyphs (symbols for the planets and various astrological arcana) are shown on screen and may be altered by a special configurator. When hardcopying to a printer without graphics capabilities (a daisywheel, say) text substitution will automatically be made for them. Altogether there are 16 print modes. A user configurable printer driver is supplied. Output is possible to any device or file. Batch processing is supported.
Professional Astrologer is used by professional astrologers everywhere.

DIGITAL PRECISION LTD

For more DP programs and prices › › › ›

PROFESSIONAL ASTRONOMER

The program they wouldn't let us sell in the USSR.

Astronomy being perhaps the least disputed science of them all, it is indisputably a good idea to understand a thing or three about it. While it must be admitted that few astronomical experiments can be performed to illustrate and enliven lessons, voyages can at least be simulated in a high-tech planetarium, or indeed on a high-tech QL.

Professional Astronomer will give you all data on the sun, moon and planets of our solar system in both numerical and graphic form (full sky display) for any moment in history. You may specify any one of five astronomical coordinate systems. The solar system is also shown in parallel projection with zoom, tilt, freeze, auto-increment and other features. The Moon, Mercury, Venus and Mars are displayed as seen from Earth with real shadows. Eclipses are accurately computed and displayed. The automatic parallax correction feature will not be found anywhere else this side of NASA.

SUPER ASTROLOGER

For fun and more, this one is hard to beat.

This is a program which, at less than half the price of Professional Astrologer, offers well over half its power and features to the beginner or the casual user. All the essential facilities are provided.

EYE-Q V2.1

The definitive QL/Thor graphics/CAD system.

Composing a graphics screen has never been easier. The sheer wealth of features of this package is overpowering, as is its user-friendliness (it is fully driven by pop-up menus, permits single-key entry and comes equipped with on-screen help). Small wonder that most commercial screens and programs using graphics on the QL have been produced with the help of Eye-Q.

Eye-Q supports windowing, paint/fill, rubber bands, freehand movement, lines, arcs, circles, ellipses, text inclusion (any csize, three text modes plus toggle-off), proportional movement, horizontal and vertical stretch, reflection, inversion, transfer, pasting, localised recolouring, magnification, reduction, localised panning, scrolling and zooming. In Eye-Q anything you do to the whole screen can be done to any part of it. A variable-width cursor is provided (with an option to select OR or XOR mode), as is a four-colour airbrush. A paintbox simplifies the selection of colours and stipples. Replicable sprites are catered for. There is an hierarchical undo facility. Numerous features simplify output to file or printer: graphic screen compression, offset display, localised save and load, monochrome save, 2 fonts and a font design facility, a fully configurable printer driver (proportionality, graphic mode, density etc.) supporting several hundred printers. Ultraprint, an optional add-on to Eye-Q, offers so much luxury in the production of hardcopy that you'll feel positively decadent.

Eye-Q comprises many other configurable defaults. Resolution may be freely switched by the user. Graphics oriented SuperBASIC extensions and two demonstration screens appealing to the eye (and perhaps to the Q, if not to the libido) are included.

Eye-Q is fully compatible with Desktop Publisher, Supercharge, Super Sprite Generator v4.0 and Turbo. It will happily interface with joysticks and the Gigamouse. Eye-Q will handle anything from the starkness of a PCB to the beauty of the human form.

If your artwork still doesn't make it into the Tate, we suggest that maybe somebody there is biased against you - Eye-Q can't possibly be blamed.

SUPER SPRITE GENERATOR V4.0

The definitive developer's tool for movement-oriented games and utilities on the QL.

Super Sprite Generator permits upto 16 frames each with upto 256 multi-coloured sprites at individually variable speeds in upto 256 planes. Use of windows with screens 1 and 2 makes for totally flicker-free movement. Working with keywords from SuperBASIC (easily compiled with Supercharge or Turbo) or machine code (including new ones in integer mode for extra speed), you have hundreds of special effects at your fingertips. Why not have sprites competing to play the national anthems of Blocklands and Droidzone while standing on their heads?

A demonstration program in SuperBASIC is supplied, to complement the instructions. It is an invaluable aid to mastering SSG.

ULTRAPRINT

The Screen Dump Supremo.

Does your QL talk to an Epson- or Oki- compatible printer? If the answer is yes, but..., Ultraprint will make your machine incredibly more communicative. Graphic printouts (screen dumps to those who prefer words of one syllable) may be selected from menus offering 22 different sizes and colour-to-b/w translation styles with up to five printer passes (handy for squeezing the last molecules of ink out of your printer ribbon).

Ultraprint is of course fully compatible with Eye-Q (including condensed screens and part screens) and any other graphics program. There are even two special modes which will handle printed circuit boards and produce perfect originals for subsequent reproduction.

Ultraprint is very easy to use: the A4 manual has been successfully tested on users normally intimidated by printer configuration procedures. It is blindingly fast (your printer won't know what hit it, even when Ultraprint is multitasking with some other program).

SUPER MEDIA MANAGER v1.12

Your data-loss insurance policy.

In a perfect world, every byte of your work on the QL would be stored instantly on at least two different devices and never be erased at all. Alas, the real world operates differently, partly for economic reasons, partly from user indolence, and overwhelmingly because of Murphy's law. Files that have become corrupted or lost (but not yet overwritten) on microcartridge or disk can be salvaged with Super Media Manager, a fully menu-driven device-management system that automates each operation to the limits of feasibility. A total of 350K of program code is provided, permitting every conceivable operation (including many types of viewing, editing and copying) on any medium, file or sector up to 256 cartridges/disks in all. Maximum user friendliness is provided by dozens of auxiliary utilities like text translation (e.g. conversion of LF into LF/CR v.v., changing of filenames to upper/lower case), alphabetising of filenames, directory of directories, hex conversion, three modes of string searching and full error trapping with automatic recovery. SMM checks out your hardware too.

Files can be read from any disk that will physically fit into one of your drives, even if the disk was formatted under an alien operating system such as MS-DOS, PC-DOS, or Acorn DFS. Full sector reading, editing and writing of alien disks is supported. A version of SMM for microdrives only is also available.

It is important to stress that SMM is not only for when things go wrong. It is designed to be your constant companion.

If there is any medium that Super Media Manager cannot handle, it must be the kind envisaged by Professional Astrologer.

BETTER BASIC EXPERT SYSTEM v2.0

The programming instructress.

Input: Your SuperBASIC program - or anyone else's!

Output: If your program is syntactically correct, well structured and easily comprehended by both man and machine: nothing (Better BASIC prefers not to burst into panegyrics that would make your head swell). If you haven't been good: gentle parental chiding and a list of things that were less than perfect, with explanations of what went wrong and suggestions for correction.

Better BASIC also takes a careful look at "obvious" statements in conditional branches, faults in which might not be discovered under the interpreter until first executed on the umpteenth run of your supposedly fully debugged program, when they would wreak all manner of havoc. On Better BASIC's advice you will get these statements right the first time. There can be no compromise with the laws of syntax and logic, but wherever there are options of program cosmetics, such as the number of spaces to be used for the indentation of loops and other structures, Better BASIC will obey your every wish.

Not only will each program you submit to Better BASIC come out in a perfected state, but you will also learn to write better programs in future by studying Better BASIC's analyses.

SUPERFORTH v2.0

The definitive Forth System.

FORTH, the language for superfast execution, is available from Digital Precision in an extensive version (FORTH-83 with full string handling and 68000 + QDOS compatibility). The compiler produces stand-alone executable code. What is more, the A4 manual gives a lucid introduction into the language, supported by detailed analyses of programs of some complexity. Forth is a stack-oriented, reverse polish notation engineered language with an ill-deserved reputation for idiosyncrasy: in fact as Forth builds up programs by building up a dictionary of words defined in terms of already known words, the language is exceptionally logical. Indeed, the SuperBASIC programmer obsessed with procedurisation is almost already programming in Forth.

To top it all off, the package includes an extremely powerful compiled OTHELLO program which beat the 1983 world-champion MOI program at this fascinating logic game. The commented FORTH source code is supplied for your edification. The Othello program is available on its own in the form of Super Reversi. May the FORTH be with you.

3D PRECISION

NEW

At last, a real-time 3D Graphics/CAD/Toolkit System.

The only 3D program on any micro that offers Stereo ("Swift Translation and Elegant Rotation of Elements and Objects"). 3D also stands for "Three Divisions", because the package consists of three interacting modules: the Object Editor, the BASIC Toolkit and the Assembler Toolkit. No programming at all is required to use 3D Precision.

You can easily design any three-dimensional and multicoloured object (technical or artistic) bounded by straight lines or circles (no regularity or uniform diameter required) with 3D Precision's fully menu-driven, rubber-banding and help-screen-enhanced Object Editor, using 3D coordinates and/or being guided by the object's on-screen appearance as it develops: you may want to test different viewing angles, shifts, scale changes, mirrorings and rotations about any axis (not just x, y and z) before saving single objects or whole worlds to files.

Saved objects and worlds may be reloaded and processed under either SuperBASIC (C, too with the graphics extensions included in DP's Digital C) or assembler code, with several dozen commands/routines (comprehensively listed in March 31st Pop comp weekly, and modifiable default parameters added by the respective toolkit. There is also a separate configurator with scores of options (even as to the keys used for each Object Editor command). Screens (2D projections) can also be output to an Epson-compatible printer or to a file (perhaps for further 2D processing by Desktop Publisher or Eye-Q): Ultraprint can be used too.

The package includes several demonstration programs: see a spacecraft land, an explosion taking place, and a car being driven around several blocks in a suburb (both from the driver's view and in birds-eye) and marvel at the speed achieved (it's like lightning!). The extensive, fully indexed A4 manual contains sections tailored to the respective thinking styles of end-users, BASIC programmers and assembler programmers.

Has your enjoyment of the QL gone flat with the years? Add an exciting third dimension with 3D Precision.

SUCCESS

The Supreme CP/M Code Emulation System.

CP/M is an operating system written in the early seventies for 8-bit single-user microcomputers. For a while it had no serious competitor, and thus a truly immense number of excellent programs now exists for it: languages like PASCAL, COBOL and C, standard packages like dBase, Wordstar, SuperCalc, and thousands of public-domain games: the list is endless. Even MS-DOS does not have as wide a program repertoire.

Normally a program written under a given operating system will not run on a computer which does not support that O/S: the multitasking 32/8-bit QL is not really built to do this kind of thing for CP/M.

Nevertheless, Digital Precision has constructed an Emulator, that is a program which will fool the QL into believing that it is a Z80-based machine and thus run any CP/M program. SUCCESS requires at least one disk drive, because your CP/M programs will come on disk. (The SUCCESS manual contains a contact address for obtaining a host of public-domain titles).

The problem with some emulators is that they require too much overhead to maintain the original program's processing speed. Who would want a Wordstar slower than Quill, or a dBase that can barely manage 22% of Archive's pace? SUCCESS, written entirely in machine code, has brilliantly overcome these limitations, thus simulating a Z80 running at 2.0MHz! Nor is there even the slightest incompatibility or restriction: everything that runs under CP/M will run SUCCESSfully.

SUCCESS comprises the three standard parts of a CP/M system: BIOS (complete hardware interfacing), BDOS (file handling) and CCP (user communication). BIOS supports microdrives, disk drives, ramdisks (7 drives in all), screen/console and printer ports and two user-definable devices. A drive configurator ensures maximum flexibility.

The DEFINE utility included in the package need be used only once for each disk to transfer its contents to QDOS. There is also a facility for copying single files. Thereafter you can run any of the programs simply by running SUCCESS. You can then edit them with THE EDITOR, or otherwise access them as if they were QDOS files. Users who do not wish to modify or write any CP/M software need go no further, but many other features are available to the experienced CP/M user. The detailed and comprehensively indexed manual is an invaluable aid both to beginners who wish to explore some of CP/M's more elegant features (eg. .COM files, STAT, ED, PIP, hotkeys, 8080 assembler, dynamic CP/M debugging and some sexy utilities) and to old hands who want to know what enhancements to standard CP/M the package has to offer.

Nothing succeeds like SUCCESS - expand your QL's horizon with thousands of the world's favourite programs.

IDIS INTELLIGENT DISASSEMBLER

NEW !

A high-speed multitasking intelligent Disassembler to complement the finest Monitors available for the QL.

Unlike ordinary disassemblers, IDIS automatically labels and automatically discriminates between instructions and data. IDIS also provides for selective/modular disassembly. Chuck out your old disassembler!

DIGITAL C

Digital C is the fastest QL C compiler (measured either by compile speed or execution speed of compiled task).

C has become the preferred language of many software developers because its compiled programs offer a speed as close to that of machine code as makes no difference. Further, C source programs are well-structured and easy to overview. No other language can hold a candle to the conciseness of C's portable code. For those who know SuperBASIC, learning C is a doddle.

Digital C's quality may be surmised from the fact that it was itself written in Digital C. In order to be fast in both compilation and execution as well as user-friendly (including QDOS compatibility), Digital C forgoes a full Kernigan and Ritchie implementation with all its daunting complexities but considerably exceeds the popular Small-C specification: additions include a library of floating-point routines as well as a QDOS library offering many I/O routines dear to the SuperBASIC programmer but not normally available in C (screen modes, windowing, graphics, sound, keyboard-handling, device-independence etc., usually with the same keyword as in SuperBASIC). 16-bit integers are processed at fantastic speed, and arrays (both numeric and string), pointers, external and global identifiers, macros and conditional compilation are supported.

Digital C needs neither extra hardware nor stacks of microdrives. A language that produces marvellously compact code should itself come in compact form, shouldn't it?

The Digital C compiler comprises two tasks, a parser and a code-generator, to do the work assigned to three units in other C compilers. Meticulous optimisation for the QL has resulted in phenomenal speed: a typical symbolic code file processed in 1 hour by the Metacomco program and in 12 minutes by Hisoft's will take no more than 45 seconds on Digital C's code generator. Its compiled code is not only fast and fully multitasking but also highly efficient: a library manager program included in the package permits separate compilation of bug-free functions into one or more modules. When a subsequent program calls these modules, only the functions actually needed will be selected, thus doing away with a lot of run-time overhead.

Digital C programs will typically run a hundred times faster than similar programs under the SuperBASIC interpreter. Much of the time, Digital C is faster (albeit marginally) than even Turbo.

To write C source code you will need to use an editor. Quill will do, but for those among you who value their time, Editor (either version) is ideal. Digital C comes with a lucid manual, comprising a tutorial section for beginners (including those who know no C at all) and an indexed reference section for tyros and experts alike. Whether C is already your favourite language or whether you are interested in why professional programmers prefer it, Digital C will not disappoint.

MICROBRIDGE

Microbridge is the most entertaining and educational bridge program - ever.

Nearly every bridge player we've met has told us he wished he were better at it, and most particularly so at bidding. Of course there are plenty of books that attempt to cure this deficiency, but they all suffer from the lack of a really comprehensive storehouse of commented sample hands to give the learner as much practice at bidding and play as he needs. Obviously we at Digital Precision had to remedy this: our answer is Microbridge, a program for learning and enjoying contract bridge bidding as well as for playing practice on any expanded QL or Thor.

The database (for which closely reasoned comments are available to the user) comprises several million randomly-generated but reconstructable deals. The bidding system used is standard Acol including the Blackwood, Stayman and either Weak or Strong No-Trump conventions (you can select which one). No previous knowledge of any convention is required, all relevant terms being explained in the manual, which also contains the text of the lessons. Microbridge has been highly recommended by bridge practitioners and by the Times Higher Educational Supplement. Only a very elementary knowledge of bridge is assumed.

Microbridge has 16 graded lessons set out with great clarity in the manual and complemented by selected sample hands in lesson files. Each hand is dealt alarmingly fast, and you are asked to make a bid whenever it is your turn. As a hint, you are given the 'picture', ie. the upper and lower limits of the various point counts of your hand, as well as what the bidding has revealed about your partner's hand.

The bid you make may fall in any of four categories: if it is illegal you will be tersely informed of this fact. If it is outrageous or plainly wrong under Acol, Microbridge will not let you go on until you have revised it (or overridden the program; in that case you have only yourself to blame for what happens in subsequent play). If your bid is acceptable but sub-optimal, Microbridge will accept it but observe that another bid would be better. If it is the optimum bid under the circumstances (or one of several such), Microbridge will tell you so and continue. Your opponents will pass, and the computer will make the bid for your partner. This continues until a contract is reached. At every stage you may ask for a detailed analysis of the reasons leading to, and the conclusions to be drawn from, each bid. No other computer bridge program comes anywhere as close to simulating and explaining the thought processes of an experienced bridge player.

The bidding of the hand may then be repeated, with a chance for modifications, or you may move on to playing the hand (always as declarer, since you won't learn all that much from being dummy) or to the next bidding example in the lesson.

After the hands selected by Microbridge for any lesson have been used up, or whenever you feel like a practice session, you may choose as many further sample hands as you like. You can either be North all the time or alternate between North and South, you may specify random or better-than-average hands (for training in slam bidding, for instance) and you may intervene on your partner's behalf or let the QL bid his hand.

The playing phase is where you must expiate whatever bidding mistakes you may have made. No more help is available at this stage, and the computer will play opponents' hands to the best of its considerable ability. It will draw every logical inference from the bidding and from previous play, but it will never cheat by 'looking' at unseen hands, let alone by exchanging cards between opponents to defeat your finesses. Every contract fulfilled by you will thus be to your credit, and if you go down it will be in honourable defeat.

Microbridge's user-friendliness is well marked in this phase. You select the card to be played by two keypresses, one for the suit and one for the denomination; but a single keypress will do in situations where there is no ambiguity, say when following suit. You may also use the up or down arrow to select the highest or lowest card of a suit respectively. The program will even override you on the former and stop a low card if the trick is already irrevocably the opponents'.

Microbridge gives you that rare chance of being an egotist and an altruist at the same time: while playing better bridge will be good for your self-esteem, it will also enhance your partners' and opponents' pleasure in joining you in a friendly game of contract bridge.

TRANSFER UTILITY

This Program transfers unprotected software from cartridge to disk - forever.

Unlike messy alternatives (FLP_USE MDV) this utility scans your files for references to Mdv and automatically converts them to Flp. In fact, the program does much more than merely this. It requires a toolkit to run correctly - but your disk interface ROM is bound to contain Tony Tebby's.

GAMES

It is commonly agreed that DP is the number one producer of quality serious software for the QL. What isn't so well known is that our games are very hard to beat - in every sense!

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SUPER ARCADIA
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* We are again looking for quality programs and programmers. If you have one or are one, get in touch.
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DIGITAL PRECISION

SUPER BASIC

Mike Lloyd imports data from Psion Abacus and Easel for implementation with last month's 3D graph generator.

Structured programming techniques allow programs to be developed in more or less independent segments. Last month's SuperBasic showed how three-dimensional block graphs could be produced from data arrays with no reference to how the data was obtained. This gap will now be filled by routines which prepare data for graphing.

The original plan for the program to include a data input segment was changed when it was estimated that it would almost double the program length without contributing anything to its main aim of drawing graphs. Instead, it was decided to make *3D Graph* compatible with the Psion packages and import data from either Abacus or Easel. The Psion screen dump program, gprint—prt was also hijacked from the Easel cartridge to save having to write a slow screen dump in Basic.

The consequences of these decisions had to be catered for in the program. The Psion screen dump program does not cover all the display area and so the main program window size and location had to be adjusted slightly to take that into account. The dump also inverts screen colours so that black on the screen becomes white on the paper. Given the structure of Easel, this is a surprising feature because a simple re-colouring of the screen prior to printing would have been more effective.

The best screen images of the graphs were obtained using a black background with black edges to each of the blocks and black stipple shading. Test dumps using gprint—prt showed that the black edges and stipples were white on the printouts, ruining the three-dimensional effect and making the blocks appear insubstantial. The background for the printouts had to be white.

View or dump

The answer was to produce different screens for viewing and for dumping graphs. Not only did this affect the design of the menu system which will be published next month but it meant that an extra variable had to be incorporated in the graphics module to switch the shading and edging colour from black to white as appropriate.

Because of the modular design of the program it was a simple process to identify where changes needed to be made and to incorporate them. If those developments had been foreseen at the design stage of the program, a better solution might have been incorporated but it is a rare programmer who can predict every eventuality and write the perfect program without a single amendment. It is more important to be able to design a program skeleton which can cope with unexpected changes without delaying the completion of the program unduly and without requiring huge re-writes of existing code.

The problems associated with Psion export files were far more serious than those caused by gprint—prt. In theory, the export option allows users to create files of data which can then be transferred between all the programs in the

Import/export: the road to prosperity in programming

The Information section of the QL User Guide includes a chapter on importing and exporting files of information between the four Psion programs bundled with the QL. Detailed and complex though the chapter is, it does not tell the full story.

The original intention behind export files was to be able to transfer information arbitrarily between the Psion quartet. The reality, however, is that the links are more bilateral than unilateral and that the file structure and contents can be modified without the user's knowledge.

Exporting is possible only from Archive, Abacus and Easel. All three programs regard export files as two-dimensional tables of numerical data with row and column labels. Archive creates a file with a line of field titles followed by rows of records. Easel creates a file with a line of names for each set of figures, followed by lines each containing a cell label and a set of values for that cell. Abacus, to be different, allows users to select whether to export by column, i.e., the orientation on the screen of rows, by turning the table 90 degrees, Oddly, it suggests "by rows" as the default option, whereas the majority of users will wish to export by columns.

Predictable

Whereas Easel and Archive import files, Abacus again offers the option of importing by rows or columns. If the orientation matches the way the data was exported the result is predictable but if data is saved by rows and imported by columns, or vice versa, the resulting contortions might be unexpected.

Because incorrectly-formatted tables cannot be imported by the Psion utilities they are keen to impose default row and label columns where the program logic thinks it wise. Thus, the first column of the first row must contain a name, usually ending in a dollar sign and usually provided by the user. Time spent thinking of a suitably apposite title is wasted, however, because the export procedure inevitably replaces the cell contents with the default word "label$."

Easel will export its default cell labels of the names of the months even if the cells are not used to dis-

Listing 11

```
1100 DEFine PROCedure Load_data
1104 LOCal file$, a$, key, loop, C
1108 file$ = Filename$: OPEN_IN#3, file$
1112 C = 0: Rmax = 0: a$ = ""
1116 REPeat loop
1120   key = CODE (INKEY$ (#3))
1124   IF EOF (#3): EXIT loop
1128   SELect ON key
1132     = 10
1136       IF Rmax
1140         INFO (Rmax, C) = a$
1144         ELSE : Cnote$ (C) = a$: Cmax = C
1148       END IF
1152       C = 0: Rmax = Rmax +(R <=10): a$ = ""
1156     = 44
1160       IF NOT Rmax AND C: Cnote$ (C) = a$
1164       IF Rmax AND NOT C: Rnote$ (Rmax) = a$
1168       IF Rmax AND C: INFO (Rmax, C) = a$
1172       C = C + (C < 10): a$ = ""
1176     = 48 TO 122: a$ = a$ & CHR$ (key)
1180   END SELect
1184 END REPeat loop
1188 CLOSE#3: Rmax = Rmax -1
1192 Title$ = file$ (6 TO LEN (file$) -4)
1196 END DEFine Load_data
```

Psion suite. In practice, the files created were often suitable to be imported into only one of the Psion packages and care had to be taken to ensure that important data was not over-written by Psion default values.

In particular, the format for an export file destined for Quill was substantially different from the formats accepted by Abacus, Archive and Easel. Because Quill files were unlikely to find their way into the 3D Graph program, this anomoly was not considered to be important but for the sake of completeness the structure of files imported into Quill is shown alongside those of the other programs in the accompanying insert.

In all, Psion export files are something of a minefield and there is no simple way of making a totally foolproof link between Abacus and 3D Graph. The accompanying screen dump of Abacus at the point of creating a suitable export file might help.

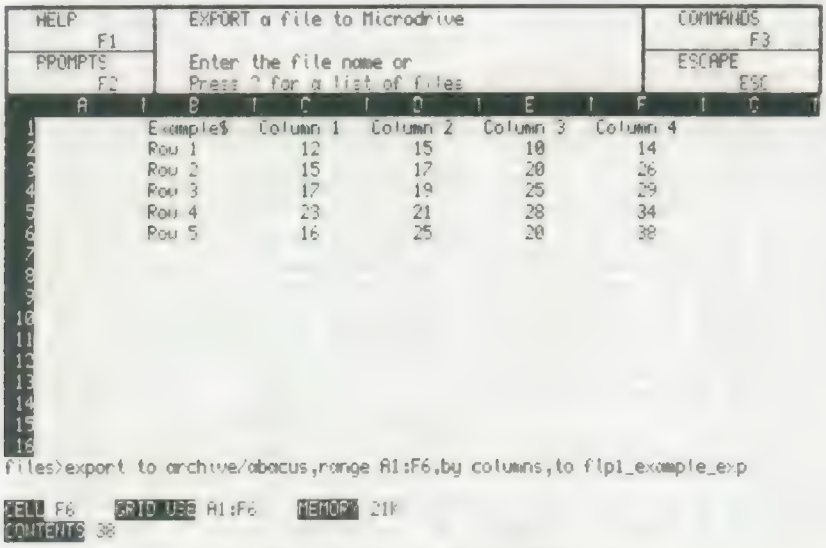


Figure 1. A typical Abacus export screen.

— or to disaster...

play data. They should therefore all be deleted explicitly if they are not required. Easel converts blank cells into an unhelpful series of commas whereas Abacus, more logically, inserts zeros or null strings to fill any blanks.

Simple

Early versions of the Psion packages produced export files ending with CHR$(27), whereas later versions end with CHR$(26) or < CTRL Z >. Either will be recognised by the importing routines.

Although Quill cannot export files it can import them. Files exported to Quill create columns by padding gaps between values with added spaces. Those files cannot then be imported by the other programs but files exported to Quill are the only ones which retain the table title faithfully in the first row of the first column.

Easel is very fussy about importing text and reads only one column of text and one row of text. Text items must not include spaces. All other data must be numeric. Abacus includes an option to export files specifically to Easel which removes unwanted text automatically and eradicates multi-word labels. Archive is not so kind.

Creating files which can be imported by the Psion programs is relatively simple and is demonstrated in the User Guide but, as this insert and the main article show, handling export files outside the Psion environment can be a complicated business.

First, there must be a blank column to the left of the table being exported or Abacus over-writes the user's row titles with its default options. Why Abacus should choose to be so vindictive with text in Column A is one of those puzzling facts which defy explanation.

Ideally, there should be no empty cells in the table, although Abacus normally supplies zeros or null strings in place of blanks in the export file. If the first row of a column is blank, however, Abacus ignores all the items in that column.

The information in an export file falls into four categories — the date title, column labels, row labels and the data. Tests with 3D Graph revealed that there is insufficient room on the screen to print row and column labels if there are more than about 10 rows and columns. The appropriate DIMension statements in the initialisation procedure therefore restrict the maximum table size to 10 x 10 cells. The limit can be changed by altering the DIMension statements if a large, three-dimensional, mathematical curve is displayed but it is recommended that the row and column labels are not then printed on the screen.

Another point to bear in mind is that the right-most column in Abacus will be the column furthest from the observer in 3D Graph and should therefore, if possible, display the largest values.

The typical table for exporting to 3D Graph takes the form of a blank column containing the table title and the text describing each row and then a number of columns, each headed by a column title containing numerical data.

To export that data from Abacus to 3D Graph select the files option and then press < E > for export. Abacus suggests that the file be exported to Quill but this should be over-written by pressing either < A > or < E > to

produce a file readable by 3D Graph. If there is nothing else on the grid, accept the Abacus suggested cell range. If only part of a grid is exported, remember to include a blank column to the left of the table.

Having selected the grid area, Abacus asks whether to export by rows or by columns. Reject the default "by rows" by pressing < C > for "columns." That ensures that the file created will be orientated the same way as the table on the screen. Finally, Abacus asks for a destination file. If they are omitted, Abacus adds the default device name and the extension "—exp." 3D Graph will read files only from the default device with the correct extension.

Pressing < ENTER > will create the export file and Abacus can be left. The two largest procedure and function definitions listed with this article now take over by importing the data into 3D Graph.

Correct filename

The Filenames$ function ensures that a correct filename is selected with the default drive and the proper extension. The listing should be changed if "flp1—" or "mdv2—" is selected to be the default device. The value of the function is that users need only declare the main body of the file name and the program will add the necessary preamble and postamble to create the full file name. If this is too restricting, the function can be rewritten to match the preference of the programmer.

The Load—Data procedure is more complex because of the structure of Psion export files. Text appears in quotes and fields are separated by commas. Ends of lines are marked by both a carriage return code, CHR$(13), and a linefeed, CHR$(10). There is also an end-of-file character which is CHR$(27) on early versions of the Psion packages and CHR$(26) on later versions. After struggling to make the best use of those supposedly helpful control characters and quotation marks, I ignored them almost completely.

The first intention was to allow the data in the export file to determine the size of the data array. The number of columns could be found by counting the number of items occurring prior to the first linefeed but the number of rows could not be determined until the last line of the file had been read. The solution was either to read the file twice, once to count the rows and the second time to load the data, or to declare a large array and fill as much of it as there was data for. The latter option was considered best.

After discovering that reading the data line by line involved a great deal of parsing to extract the required information, it was found to be preferable to read the file character by character and only to take note of three classes of character. The first is the linefeed code, CHR$(10); the second is the comma, CHR$(44); and the largest class is formed by the printable characters from "0" to "z".

The first piece of information read is the table title but when export files are created the title is invariably replaced by the Psion default name, "label$." Inquisitive readers will not find it difficult to circumvent this but they will then find that Abacus removes all the column labels and replaces them with column labels of its own devisir 3D Graph solves the problem first replacing the vague "label$" with t main body of the filename, which least reveals some information abo the data it accompanies. Second, t user is given the option of declaring new graph title — see listing 13.

The rest of the information on t first line extracted from the file a column labels separated by comma The quotation marks are ignore When the first linefeed is encounter the maximum width of the tabl CMAX, can be fixed and the oth variables initialised ready for the ne line to be read.

On the subsequent lines the routir knows that the first piece of inform tion is the row label and it will b followed by a value for each column i the table. The final character on th line is a linefeed rather a comma.

Safe accidents

The program must be able to handl the accidental loading of too much dat to be held in the INFO array withou producing an error message. If mor than 10 rows or columns are read th extra ones over-write the tenth row o column. That inevitably corrupts th data but the effect will be obvious an the cure is simple. The dimensions o the appropriate arrays can be change or the table size can be reduced. An changes to the dimensions of the ar rays INFO, RNOTE$ and CNOTE$ i the initialisation procedure listed las month must also be reflected in line 1152 and 1172 of listing 11.

The three logic statements on line 1160 to 1168 are mutually exclusive Expressed in English they mean:
IF it is the first line in the file AND it is at least the second item THEN a$ must be a column label.
IF it is not the first line AND it is the first item on that line THEN a$ must be a row label.
IF it is not the first line AND it is not the first item in the line THEN a$ must be a table value.

The final control code in the file, CHR$(26), is ignored and the loop is terminated when the end of the file is detected at line 1124. By this stage the row counter, Rmax, will have been incremented once too often and so it is reduced by one to equal the correct number of rows.

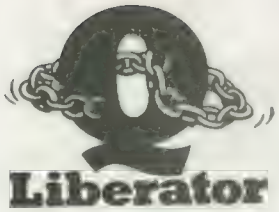
Most of the elements of the program are now in place but for the moment they are unconnected. Next month's article and listings provide the essential control structure for the program. Readers who remember the earlier SuperBasic foray into the world of menu systems will be pleased to know that the 3D Graph menu is of a different structure from those covered previously.

Listing 12

```
1200 DEFine FuNction Filename$
1205 LOCal file$
1210 WINDOW 448, 24, 34, 11: BORDER 6: CLS
1215 INPUT "Enter file name:" ! file$
1220 IF NOT "_exp" == file$ (LEN (file$) -3 TO )
1225   file$ = file$ & "_exp"
1230 END IF
1235 IF NOT "mdv1_" == file$ (1 TO 5)
1240   file$ = "mdv1_" & file$
1245 END IF
1250 RETurn file$
1255 END DEFine Filename$
```

Listing 13

```
1300 DEFine PROCedure New_title
1310 WINDOW 448, 24, 34, 11: BORDER 6: CLS
1320 INPUT "Enter title:" ! Title$
1330 Menu
1340 END DEFine New_title
```



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QL World August 1987

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For the committed enthusiast with expanded memory, Q-LIB 3.2 is the ultimate SuperBASIC development system. Faster all round then the budget version, QLIB 3.2 has advanced facilities to support modular program development. As well as EXECutable jobs Release 3.2 can produce libraries of compiled procedures or functions. Just imagine, with this powerful facility you can create your own toolkit written in BASIC. Procedure libraries can be us ed as if they were an integral part of SuperBASIC by any job, even the interpreter. Procedure libraries can be loaded and unloaded from memory as required, or linked to programs or loaded into the RESPR area or even put in ROM. And all this is done automatically without complicated programstatements making this the most flexible compiler available.
Release 3.2 has the benefits. Compiler optimisation and automatic integer arithmetic (including FOR ENDFOR loops) make it over twice as fast as budget Q-Liberator. Files produced by QLOAD can be compiled directly and 3.2 produces compact re-entrant code which can be put in EPROM if required.
Release 3.2 has a convenient menu driven user interface with a comprehensive context sensitive HELP function to describe the many options available. QRAM users will find themselves immediately at home because Release 3.2 can also be pointer driven and compiled programs can be hotkeyed.
Upgrades: Budget to QLIB 3.2 £30 or £45 for ROM
2.x or 3.x to 3.2 £10 or £20 for ROM

Q-LIBERATOR ON ROM £75.00

For maximum speed the nucleus of 3.2 is available in a 16k EPROM cartridge, essential for 128k users who want the facilities of 3.2. The entire compiler can also be supplied on a 64k ROM for use in the THOR or a suitable QL expansion board.

SPECIAL OFFER . . . QLOAD included free on QLIB ROMS!

QREF £9.95

QREF is an enhanced cross reference utility for SuperBASIC. QREF prints sorted tables showing all line numbers where selected procedures, functions or variables are referenced. Because QREF is RESIDENT and INTERACTIVE, its facilities are always instantly available when debugging. The wild card selection of names lets you cross reference anything from one variable to the entire ROM. As a bonus, there's a FINE command for the SuperBASIC editor and a command to reveal the start address of machine code procedures.

"an invaluable utility" — *QL WORLD August 1987*

SAVE MONEY QLOAD AND REF TOGETHER **£15.00**

Send SAE for further information. Please specify flp or mdv when ordering. Prices valid for all Europe. Send sterling cheque or UK PO to:

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TECHNICAL HELPLINE

Paul Walton is on the line

Self-printer

I have a daisywheel printer to which I can print from the Psion programs but I have not fathomed how to print from a self-written program.

B. P. Barry, London.

One of the strengths of Qdos is the fact that its commands are device-independent. That means anything you send to the screen can equally well be sent to the ser1 serial port. If your printer is connected to the port and the port configured properly you will get a printout.

The trick is to configure the ser1 port and your printer to be compatible in repsect of baud rate, partity and start/stop bits. They can be set on your printer through the DIP switches described in its manual.

On the QL, these parameters can be set up using the BAUD and OPEN commands. The following program segment shows how:

```
10 BAUD 1200 :rem baud rate of 1200
20 OPEN #3, ser1 :rem direct #3 to ser1
30 PRINT#3, "This should be output to your printer"
```

You can use any channel number from 3 to 15. Do not use 0, 1 or 2 as they are used by Qdos for screen output. At the end of the program you should close the channel:

```
90 CLOSE#3.
```

The QL defaults for ser1 are 9,600 baud, ignore parity, 2 stop bits and handshaking on the DTR line. If your printer is matched to these the SuperBasic program listings, or any other text file on Microdrive, can be sent to the printer using the direct command:

```
COPY mdv1—name to ser1
```

Hard to assemble

Can you recommend a book on assembly language programming for the QL which assumes no prior knowledge?

Is there to be a fast line drawing routine in the excellent Toolkit series?

D. A. Elgee, Blackpool.

One of the difficulties involved in learning assembly language is that it requires some understanding of how the hardware works. Couple this with an advanced processor such as the 68000 and it makes for hard work. I would suggest not to restrict yourself to books for the QL. Try instead going to a good bookshop and finding a book on the 8080, 8085 or Z-80 assembly languages. They are 8-bit processors with assembly languages which are rather like simplified versions of the 68000. There are many of this type of book from which to choose and you should have no difficulty finding one you like. After that you should find your existing books on the 68000 easier to follow.

The question of a fast line-drawing routine is interesting, because a toolkit extension would probably use the Qdos calls for line drawing. They are excellent general line-drawing routines which accept channel numbers and floating point co-ordinates and draw the line to the appropriate channel window, scaling it, clipping it and drawing it in the set colour.

The problem with all this is that it slows the process to about 25 lines per second. If your application can work with integer co-ordinates, overcome the clipping requirement and use fixed colours and screen windows, a simpler line-drawing routine can be written which will do more than 200 lines per second. The following algorithm will draw a straight line from the point (x,y) to the point (x+a,y+b). As it stands it works only if a > b > O:

```
10 flag = a div 2
20 FOR i = 1 TO a
30  POINT x,y
40  x = x + 1
50  flag = flag + b
60  IF flag > = a THEN
70   flag = flag − a
80   y = y + 1
90  END IF
100 END FOR i
```

I am thinking of expanding my QL to 512K RAM, twin disc drive, parallel printer port and a QEP III EPROM programmer. How can I connect all these?

S. Johnson, Co. Durham.

One of the limitations of the QL has always been the problem in connecting more than one device to the expansion slot at the left-hand side of the machine. There are various single boards available containing all of extra memory, disc interface and serial/parallel ports. The problem is that they all go into the expansion slot.

In all such matters, the best solution is to talk to the product supplier before you pay for the device and to make sure that the configuration you have in mind is possible. If you look in the September and December, 1987 issues of QL World *on pages 18 and 30 you will see an article on memory add-ons and an advertisement for QL-BUS. I have not used the QL-BUS yet, but it claims to be able to hold up to five expansion slot boards.*

Super defined

Can you list the contents of the SuperBasic channel definition table?

R. Stouffs, Belgium.

As the SuperBasic area can move dynamically, machine code routines called from Basic must have a means of knowing its whereabouts. On entry to a machine code routine, the address of the start of the SuperBasic area is held in address register A6. All tables are then addressed relative to A6. The channel tables, one per open channel, are 40 bytes long and the table for channel #n is located at the address given by the expression [48 + (A6) + 40n]. The contents of each table are:

Byte 0: Channel ID - 4 byte integer.

Byte 4: Cursor Y position -6 byte floating point.

Byte 10: Cursor X position - 6 byte floating point.

Byte 16: Turtle angle - 6 byte floating point.

Byte 22: Pen status up/down - byte.

Byte 32: Character position - 2 byte integer.

Byte 34: Width of line - 2 byte integer.

Two in serial

I notice that there seems to be a difference in the ser1 pinouts shown in Helpline of October 19, 87 compared to the QL User Guide. Which is correct?

J. D. Hederman, Dublin.

Both are correct. When talking about RS232 interfaces each pin is given a name. Pin 2 is called TxD which stands for transmitted data. So if your printer is configured to receive this data on pin 2 you might still refer to that line as TxD. When data is sent down a line from the QL to a printer it is natural to think of the QL transmitting and the printer receiving. Consequently, in Helpline in the October 19, 87 issue, we chose to describe the pins from the printer point of view, hence the line along which data was being sent to the printer was labelled as RxD — received data.

The QL User Guide, in the Concepts section under communications, gives a readable explanation of the confusing subject of the RS232C standard.

ORDERING INFORMATION

The **QL SPEEDSCREEN** package costs £30 complete, for the RAM cartridge, utility files, manual and ROM implementation notes. Please tell us whether you want the extra utility software on microdrive, 5.25 or 3.5 inch 1440 sector floppy disc.

UPGRADES from the RAM version cost £20 - please state the serial number printed on your original disk or cartridge when ordering an upgrade. You keep the RAM version: we send the ROM cartridge and extra documentation.

The RAM version of **SPEEDSCREEN** is still available, priced £20, On microdrive or disc (please specify).

All **SPEEDSCREEN** versions are available now. Prices include first class or airmail postage anywhere. **PAYMENT MUST BE IN STERLING:**
UK P.O's or cheques, Eurocheques or Bank Drafts. 7 day service.

THOR owners: **SPEEDSCREEN** for the **THOR** is available direct from **CST.**

THE BEST YET!

SPEEDSCREEN ROM

SPEEDSCREEN, the fast QL display upgrade, is now available as a plug-in ROM cartridge - faster and more flexible than before. Upgrades are available for existing users.

SPEEDSCREEN makes software faster and easier to use, by replacing slow routines inside Sinclair's QL with new code that's up to 12.6 times faster displaying text, or 8.2 times faster at scrolling. Cursor and window clearing operations are also much faster. Displays look just the same, but appear much more quickly.

The SPEEDSCREEN ROM uses the latest fast components: a QL can read code data in our cartridge twice as quickly as code in its internal memory. The SPEEDSCREEN ROM is even faster than most makes of add-on memory. It's instantly available when you turn it on, and speeds up the display without using up any of your program or data memory.

Programmers: **ROM SPEEDSCREEN** supports **FOUR COLOUR FOUNTS** - character sets printed up to 12.6 times faster than normal, where each character can contain red, green, black and white dots anywhere on a 72 pixel grid. All versions of **SPEEDSCREEN** come with Toolkit commands, new character sets, test and design utilities, plus full documentation.

QUICKFAX

QUICKFAX is a new data storage system by Simon N Goodwin, designer of SPEEDSCREEN, TURBO and SUPERCHARGE. QUICKFAX is elegantly simple to use, yet very powerful.

QUICKFAX lets you flick through records on the screen like a box card file. Each 'record' contains a number of separate 'fields': boxes on the screen where data can be entered, copied or edited.

You can move, add or delete field boxes at any time. There's no problem if you enter a few hundred records and find you need a new field — you just add it on. Card file fields can be up to 22 lines long, and any rectangular shape, with 'word wrapping' for easily-read text. Only the data entered is stored, so a short entry in a big box does not waste space in memory or on file.

You can label the data in colour with helpful information, reminders or prompts. You can select alternate card layouts while using a file.

QUICKFAX can issue flexible printed reports to any device, with your choice of fields and headings, columns or blocks of text and numbered pages. Records can be 'selected', much as in Archive, so you can confine reports to certain 'exceptional' records.

QUICKFAX can sort data into ascending or descending order, based on the value of any field, or a sequence of fields. Data can be loaded into QUICKFAX from Archive, Quill, or any text file, with no need to re-type. QUICKFAX runs on any QL system.

PROTOTYPE PERFORMANCE

Load data:	**100K in 8 secs. (FLP) 18 secs. (MDV)**
Save data:	**100K in under 20 secs (FLP or MDV)**
Search:	**100K in 0.48 secs. (CST RAM)**
Add Record:	**Instant in 100K file**
Zap Record:	**Instant in 100K file**
Record size:	**Up to 32,760 characters**
File size:	**Up to 32,760 sorted records**

QUICKFAX runs an independent task, communicating instantly with any language that supports 'pipes' — e.g., SuperBASIC, Pascal, C or Assembler. So programmers are not tied to the 'card file' display — they can use QUICKFAX as a 'background' tool to organise data; reading, writing and manipulating data with QUICKFAX routines under the control of a separate program. One program can control several files.

QUICKFAX is being tested now. It will cost £20, for the card-file with clear and complete documentation, PLUS a stand-alone database engine, configurator, run-time package, SuperBASIC extensions, example file cards and application code.

Please send us a Stamped Addressed Envelope if you want to be notified at once when QUICKFAX is available.

SPEEDSCREEN REVIEWS:

....."Does it work? My answer is a definite yes, and the proof of this is that when I do not load it and use something screen-intensive, like Quill or Editor, I wonder what on earth is wrong, as everything seems slowed down. The effects of TURBOQUILL+ and SPEEDSCREEN are additive and make Quill very acceptable in use. I think SPEEDSCREEN will be one of those programs no one will want to be without."

QUANTA, January 1988

....."The speed increase is phenomenal..... the package is well thought-out, thoroughly tested, easy to use and sensibly priced...it has the advantage of enhancing almost every piece of software available, without requiring any computer literacy from the user..SPEEDSCREEN will be very popular indeed."

QL WORLD, December 1987

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text87

The Advanced Wordprocessor for the Sinclair QL

NOW IN VERSION 1.04 WITH LARGER MANUAL

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Prices are inclusive of airmail worldwide. Payable by cheque or Eurocheque. Please specify cartridge or disk. Upgrades to version 1.04 cost only £5 on receipt of the original disk and manual.

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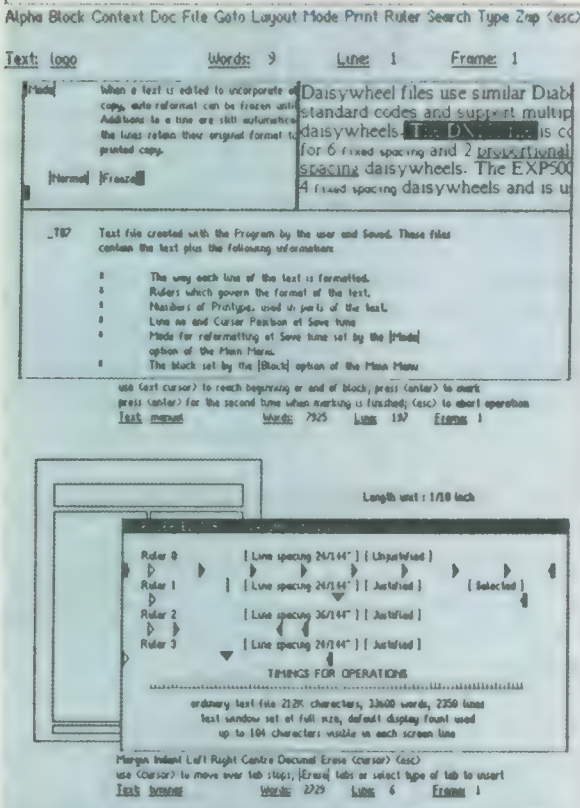


* Many rulers can be predefined and inserted freely anywhere in the document. Left, right, centre and decimal tabs are available. Daisywheel and dot-matrix printers are supported. Micro-spacing, micro-justification, proportional spacing, up to nine-spacing can all be used on most printers. Multiple line headers and footers with variable format plus up to 4 columns can be printed on a page.

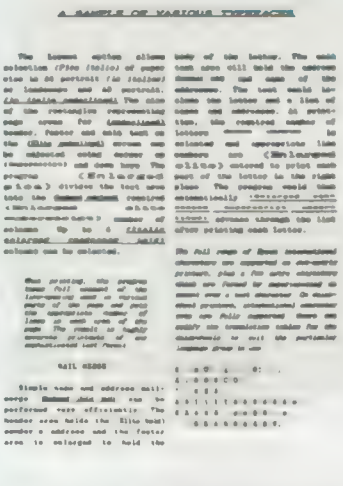
text87 is the powerful WYSIWYG general-purpose word-processor for the Sinclair QL. text87 provides very fast editing commands plus block operations, search and re-place, file insert, block save and many more through quick menus. Auto-word-count, Auto-reformat and Freeze options are available.

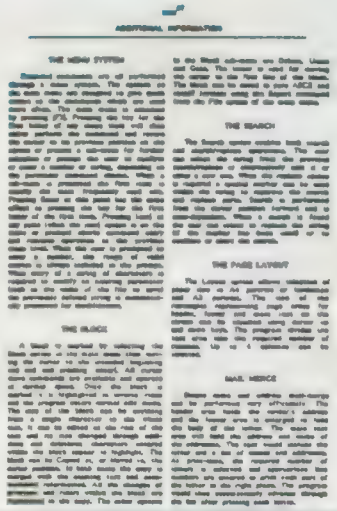
text87 uses special video display founts with variable character size up to the size of text window. Many founts can be loaded and mixed on the same line. Characters can be displayed in each of the three colours. New founts can be designed with founted87.

text87 operations are extremely fast even with very large texts (eg searches whole 100K text in less than 2 seconds). Screen display is more than twice as fast as the QL's own routines. The program is very compact and can use any amount of memory expansion. Texts of up to about 480,000 characters can be edited on a 640k QL.

text87 is a well-behaved executable multi-tasking program with resizable text window. text87 is compatible with Spellbound, Flashback, Qram, Qtype and the Thor. It can import Quill Doc files retaining all the tabs and highlights, in addition to any ASCII file.

Print Samples





WIN a COLOUR MONITOR for your QL FROM SANDY UK and QL World

QL Artist of the Year COMPETITION

QL World, the only magazine for the Sinclair QL computer, and Sandy UK, purveyors of peripherals, perquisites and the powerful QL itself, have put heads together to find a fitting award for the QL artist of the year.
The prize we have chosen is a full colour monitor — just the thing for hi-resolution graphics.

This is what we would like you to do:

Devise a graphic display which tells the world what a terrific machine your computer, the Sinclair QL, really is.

You can do this in any way you please. Your display can be a single screen, or a sequence of screens; it can be a static picture, a developing pattern, or an animation, it can be in colour or in black and white; entirely pictorial, or mainly words — but remember, we will be judging you by your design, not your eloquence!

It can be on a Microdrive (if so, please send us a stamped, self-addressed envelope or an international postage coupon for its return) or a printout. You can build your design from a program of your own, a graphics or desktop publishing package (in which case, please tell us which one you need), imported images, anything you like which gives you idea and images to play with.

All entries will be judged on the impact they make, and on the elegance and ingenuity with which you have used your QL as a design assistant. Whether your program is long or short, simple or complicated, our judges will ask — do this QL and its user make a great team?

So — if you are a brilliant programmer you can bring the full force of a dozen routines to bear, if your prefer to spend hours steering your mouse or plotting co-ordinates, you can call on your skills with colour or perspective, and if you just love your QL — have a stab; you may be the one to get the message through.

To enter:

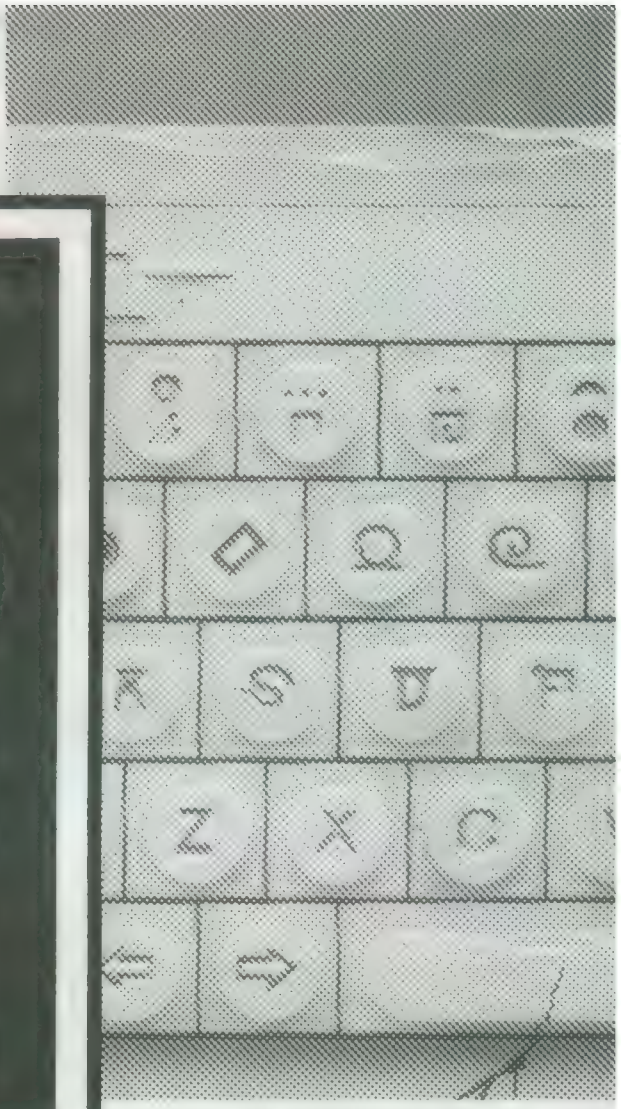
- Send your design, on mdv or disc, or as hard copy (in which case, please send us a printout of your program or a note of which package/s you used), to QL World Art Competition 1988, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.
- Make sure your name and address is enclosed with your entry, and a self-addressed envelope and postage for return of material.
- Each entry MUST be accompanied by the corner coupon at the bottom of this page. Only original coupons will be accepted.
- All entries, regardless of source material, must be in their finished form the original creation of the entrant.

QL Artist of the Year ENTRY COUPON

QL World reserves the right to publish finished artwork derived from entries in future issues of QL World. All rights apart from this remain with the entrants.

Entries must arrive at the QL World office on or before 30th June 1988. Proof of posting is not accepted as proof of delivery. The judges' decision is final and no correspondence will be entered into.

QL FIRST FORM



In the second of three articles on beginning computing, Mike Lloyd puts different classes of software in context.

Most programs available for the QL can be used without no computer expertise and while some are aimed unequivocally at the seasoned programmer it is surprising how many fall into the hands of the QL novitiate. This month's feature explores the broadest reaches of commercial software. The most trivial, the least demanding but perhaps the most enjoyable commercial products are games. They fall into four main categories, although there are hybrids which tend to blur the dividing lines.

Arcade games involve plenty of screen activity and frantic keyboard or joystick manipulation, typically to kill aliens or avoid being killed by aliens. A more sedate but often just as deadly pastime is an adventure game. The storyline develops according to choices made by the player.

The third category comprises simulations in which the object is not to score points but to re-create activities such as flying an aircraft or commanding a warship. Some would argue that simulations are not games but, as their purpose is to entertain rather than instruct, they are included.

Formidable opponents

The final category is formed by the computerised equivalents of board games such as Chess, Scrabble and Reversi. Computers can be formidable opponents or they can control the screen presentation while two humans battle.

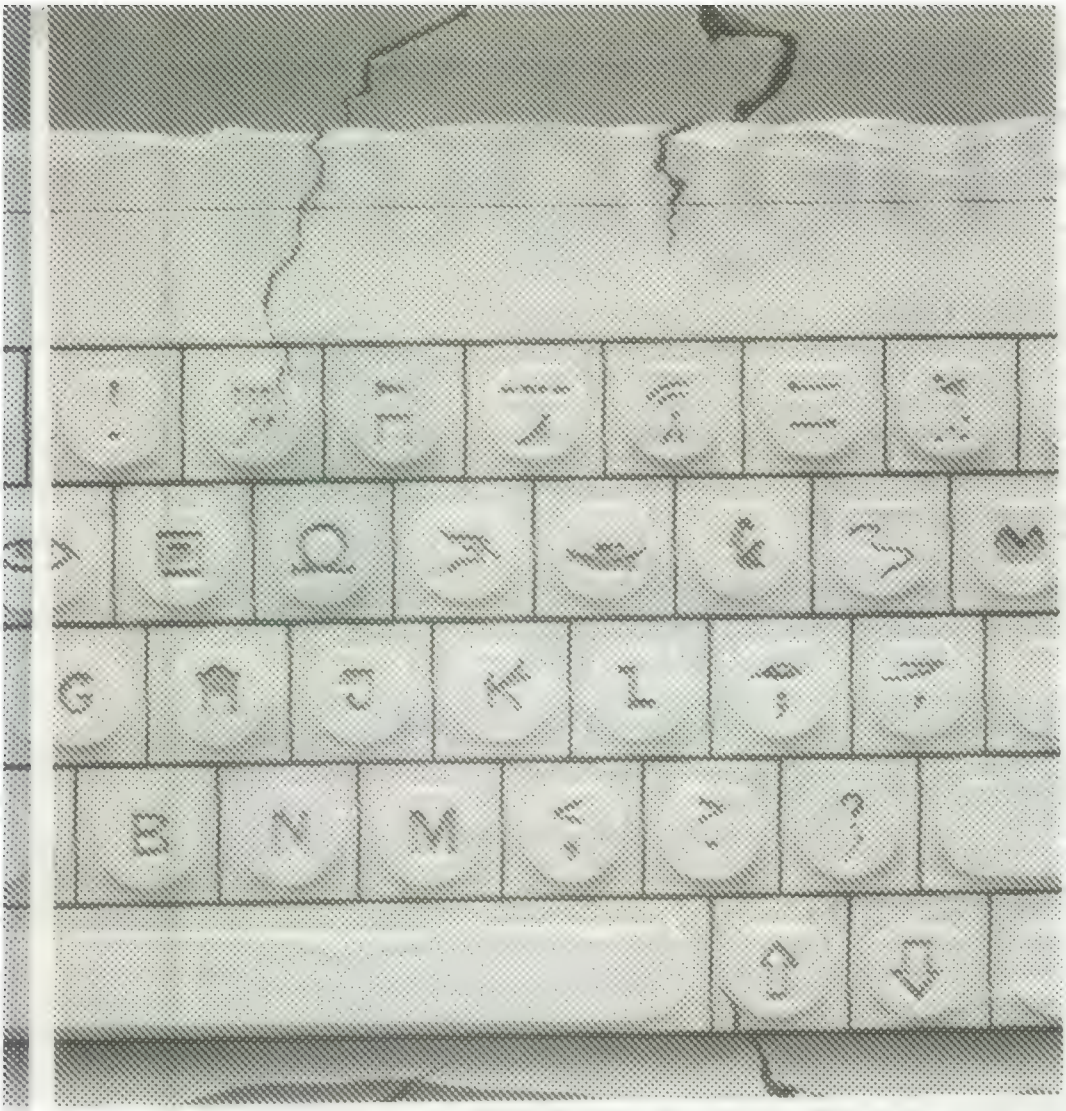
Almost without exception, games are run by switching on the QL, inserting a Microdrive cartridge, pressing F1 or F2 and following the instructions. No computer expertise is required or expected.

The alternative to games software is often described as "serious software," impying that slaughtering aliens is not particularly serious. Serious software ranges from business programs which assume no computer expertise but may well require knowledge of subjects like accounts or stock management, to programming languages where computer literacy is an obvious and understandable pre-requisite.

Serious software should be aimed either at the computer user, where no level of computer literacy should be assumed, or at the computer programmer, in which case there need be no holds barred. Some products fall uneasily between the two categories and it is in this area that most of the problems occur. Making utilities not just foolproof but fool-friendly is time-consuming and eats memory space which programmers much prefer to fill with extra items.

Additionally, software manufacturers have tended to over-estimate the computing abilities of QL owners. The situation can be improved for QL owners increasing their level of expertise by reading *Sinclair QL World* by software manufacturers tailoring their products more precisely for the real market.

For some QL owners, enlightenment begins with a definition of the term utilities. A utility is not an end in itself but a means to an end. A utility might assist file-handling by producing sorted and tabu-



lated directories and offering automatic viewing, copying and deletion facilities. It cannot be played with, neither does it improve what goes into the files. A utility is the computing equivalent of an electric drill or a hammer; owning one is pointless unless it is used to make something of value.

Many utilities are fairly short machine code programs which are not sold individually because the distribution costs — advertising, Microdrive cartridges, instruction booklets, postage and packing — outweigh the value of the program. They are therefore sold as a package called a toolkit on a single disc or cartridge.

Toolkit contents

Just as a woodworker's toolkit might contain some indispensable tools, some useful tools and some rather outlandish specialist tools, computer toolkits tend to have a mixture of useful, not so useful and bizarre contents. Again, just as there are specialised toolkits for car maintenance, plumbing, woodwork and decorating, computer toolkits exist for specific areas such as file management, programming aids, screen dumping or mouse management.

A typical toolkit is that written by Tony Tebby, available either separately or incorporated into disc interfaces. In essence, it provides many SuperBasic commands which Tebby felt were missing from the SuperBasic programming language installed in the QL.

When the QL was launched it depended on Microdrives to store information. With the availability of disc drives new routines were needed for the QL to use them. The toolkit provides them. The QL has been criticised for the way in which SuperBasic program lines are edited and the toolkit contains code to improve the editing environment. It also contains an on-screen clock, a way of re-naming and date-stamping files, a procedure to copy files in bulk from one medium to another — e.g., from Microdrive to disc — and so on.

More arcane commands include those which control jobs — multi-tasking programs — and allow programmers to write directly to disc or Microdrive files as if they were writing to the QL internal memory. They are for the specialist programmer.

What will a toolkit do for you? That depends on your level of competence. A craftsman might create a masterpiece with basic woodwork tools; all I ever made with them was a teapot stand. Similarly, advanced computer users might find a dozen things to do with toolkit commands for which lesser mortals never see a need.

Some large utilities are sold on their own rather than in toolkits. Good examples are front-ends, programs which assist users to control their computers. Front-end is a piece of jargon designed initially to be helpful but which has caused confusion. An analogy is provided by the role of a bank clerk. The clerk sits between customer and the bank administrators and translates the customers' requirements into instructions which the administrators understand.

An example of a front-end is *Ice*, a program which represents the QL environment as a desk-top full of symbols, called icons, which represent QL commands. Files are represented as labelled folders and they can be deleted by moving the folder to an icon of a wastepaper basket. This is the equivalent of typing the command *DELETE MIDV1—MYFILE*.

One of the most common facilities offered by front-ends is the ability to load and run several programs at once on computers with sufficient memory space. Switching between programs is a simple matter of pressing the CTRL and C keys together.

Faster RAM

Another popular utility is the RAM disc. This routine takes over a portion of the QL memory which is then treated as though it were really a disc or Microdrive. Files can be opened, programs saved and directories produced using the same commands as for a Microdrive but using the device named RAM instead of MDV. RAM discs are much faster than ordinary discs but, of course, like all RAM, a RAM disc loses its contents when the power is turned off.

On the Microdrive containing the Psion Easel program there is a short utility called *GPRINT—PRT* which prints screen images on to Epson-compatible dot matrix printers. This slow and crude utility has been surpassed by several powerful, flexible printer drivers which can talk to almost any make of printer and produce screen images in a variety of sizes and print intensities.

Some utilities are designed to complement a particular program. One example is *Turbo Quill*, a utility which accelerates the Quill word processor and is of use only to QL owners who find Quill too slow for their needs. At the other extreme, the Creative Codework *Speedscreen* is very general and it will speed screen printing in Mode 4 for all programs, both commercial and individually-written.

This review cannot cover all the utilities on the market; desk-top publishing and computer graphics are just two areas which have been ignored. Where individual packages are concerned the major dealers advertising in *Sinclair QL World* are always willing to give good advice to personal callers or by telephone.

PDQL

ARCHIVERS DO IT WITH PDQL

Archive users are well served with PDQL utilities.

ARCHIVE TUTOR

Teaches you all you ever wanted to know about the mysteries of Archive. Iteractive — it runs in Archive version 2 and later — it demonstrates all the Archive commands and functions with comments and examples of uses and abuses of the system. Many unpublicised uses explained. You can even learn from the way TUTOR has been built! **£21**

ARCHIVE DATEBASE ANALYSER

This program analyses an existing database file reporting on the number of records, average record size, number of times each field is used and maximum individual record useage. This assists in tightening your field usage by throwing away redundant fields, altering overlength fields etc. Reports to printer, screen of file. **£7**

SEDIT

The easy way to design your archive Screen — extends functionality of the Archive Sedit command beyond recognition — many extra commands and cursor movements available **£15**
Recently enhanced version now available.

ARCHIVE SCREEN FORMAT PRINTER

This most useful utility prints your screen format form file as it would appear on screen together with a directory of ink/paper colours and changes and co-ordinates and string lengths of all variable field **£7**

ARCHIVE DATABASE RECOVERY

The insurance program dedicated to recovering lost database files on disc or cartridge. It creates an Archive export file converting alien symbols into per cent signs to simplify the recovery process. aka Archive on The Mend and Recover. **£20**

PDQL addresses the problem

NAME and ADDRESS **£18** for Archive Use
£36 for ArchDEV Use

A menu driven, general format Name and Address system which you can modify to suit your particular needs. You can create your records, amend, delete, search and print in alpha or insert sequence to screen or printer the full records or merely name, first address line and telephone number. Apart from selective listing, the system can print labels and enjoys general mailing and mailmerge type features.

The bonus is to use it with the recently modified

MAILMERGE de LUXE

Mailmerge reads a file from Quill or Editor and creates an Archive prg. When run in Archive the prg a personalised letter is created which "picks up" the fields in your database file. De luxe features include default expressions for null fields e.g. Dear Sir if no surname exists etc; lines ignored for null fields e.g. Company name. Print may be halted for cut stationery use or at any time during the print run. **£14**

COMPARE

Displays in character, HEX or decimal any differences between two supposedly identical files, each sector containing a mismatch shown on screen; reposition by number and magic panel alignment to continue the scan. Program line numbers can be ingnored **£10**

PDQ-XREF — Indispensable

Provides a full glossary of user-defined key words in your SuperBASIC program. Every occurrence listed in alphabetical order with line numbers reference and type of user summary gives warnings of names used but not defined, or defined but not used. Typing errors immediately spotted **£15**

LAZARUS raises from the dead those text files lost on disc — grieve no more **£20**

SPEEDSCREEN speeds up your QL, window handling, scrolling, etc, in Psion and other programs **£20**

SPELLBOUND checks as you type **£29.95**

FILEBOUND (Turbo'd) checks old documents in;
SPELLBOUND at three workds per second (minimum)
Together **£35**

FILEBOUND on its own £5 — send s.a.e. and blank disc/cartridge with remittance.

THE EDITOR SPECIAL EDITION printer driver includes, block-copy by line, character or column, mny other improvements **£49.95**

FLASHBACK the new data handling system **£25**

PSION Suite upgrades: v. 2.38 Archive and vs. 2.35 Quill, Abacus and Easel £5 each — send s.a.e. + disc/cartridge with order.

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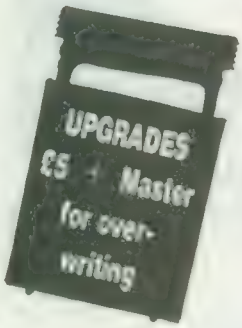

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DIY TOOLKIT

Each month Simon Goodwin adds new commands to the QL repertoire. This month's routines let you check the details of screen windows.

The QL lets you do a great deal with windows — alter their sizes, move them around, pick colours, borders, character shapes and sizes, position or control cursors, and more besides. All of those details and other useful data are stored in a 'channel definition block' but there is no way for a Basic programmer to assess that information once it has been set.

SuperBasic includes commands to SET those options but there is usually no way to find the current settings. This month's DIY Toolkit routines let you interrogate QL windows to find their details. They make it easier to write reliable, flexible software.

In many cases you can keep track of details in your program with no need to ask the operating system but that is fiddly and prone to error. If you have to keep duplicate copies of information you run the unnecessary risk that you and the operating system will get out of step and disagree. The system is keeping track of this information, so why should you have to store it separately?

In some cases you cannot expect your program to recall the details of a window. Compiled programs can be passed channel parameters by other tasks. One task might open a window or a file and then ask another task to write to it. In this case our new functions are the ideal way to find how results should be formatted without making restrictive assumptions.

This month's column introduces three new functions — CHAN B%, CHAN W% and CHAN L. They are much like PEEK, PEEK W and PEEK L, in that they are used to read byte, word and long values from an address.

The difference is that the address is an offset inside a system table called the 'channel definition block,' so it is usually a fairly small value. It is always accompanied by a channel number, so the functions can tell about which window you want to know.

All the functions have two parameters — a channel number and the offset of the required data in the channel information. To display the long word in bytes 42-45 of the information about channel 2, which is the address of the first character font being used by that channel, you would type:

```
PRINT CHAN L (#2,42)
```

The functions check that the channel number corresponds to an open display channel, normally an 'SCR' or 'CON' channel on a standard QL.

Table one shows the offsets which correspond to useful long word values in the channel table. These offsets, and more besides, are documented in books like Andrew Pennell's *Sinclair QDOS Companion*.

Table two shows the offsets of word values. Display window widths and positions are always even numbers between 0 and 512. Horizontal measures must be even so that they still make sense when you switch to MODE 8, with half the number of pixels on each line. In MODE 8 there are no pixels at odd X-co-ordinates. Vertical sizes and co-ordinates can be any value between 0 and 256, odd or even.

Undisturbed

Table three shows offsets of single-byte data. Like the results returned by PEEK, they can have any value from 0 to 255. The functions have been written to work reliably on any QL-compatible computer, including the CST Thor and Thor 16. The code uses the SD.EXTOP routine, designed to add new functions to the operating system. That means that it is not disturbed by the extra channel information which some systems tack on to the start of a channel block.

You could write simple versions of the routines in Basic, using a sequence of PEEKs, but such routines would not work on a Thor or a QL running QRAM. By going through the operating system, our new functions ignore the extra information but you can get at it if you know the format by using negative offsets with these functions.

The functions work well in compiled programs, when they are often particularly useful.

By the dozen

The CHAN enquiry functions make it easy to write adaptable programs and routines. There are dozens of possible examples, so I will summarise a few. You might need a routine to display text, line by line, without breaking words at the right-hand margin. Such a routine needs to know the number of characters which can be printed on the next line. You can easily work that out with the CHAN functions:

```
ch width% = CHAN W% (# n%,28) DIV CHAN W%(# n%,38)
```

That statement determines how many characters can be printed on a complete line in window N%. If the line is already full you can check the amount of space remaining, in characters, by subtracting CHAN W% (#n%,34) from the width, read from offset 28, before dividing by the character width at offset 38.

That may look rather fiddly compared to passing a parameter to the routine or just putting in the width as a constant value but it has many advantages, particularly if you intend to tinker with the program later.

This statement adjusts the number of characters it will allow on a line whenever you change the character size, the border colour, the size of the window, the display mode, or the character-spacing — set with other Toolkit routines like XSTEP, YSTEP or CHAR INC.

If your routines assumed a particular line width you would have to check and change the code every time you altered any of these settings. You would probably settle on fixed

character and window sizes, depriving the user of your program of much of the flexibility of the QL display.

Very similar calculations can be used to check the number of lines which can fit in a window, so that output can be printed in pages with a pause between each. Friendly QL programs let users move windows round the screen to suit their display or to make room for windows shown by other tasks. The CHAN functions make it easy for a program to keep track of its windows and adjust to changes in their position, shape or border.

Most QL toolkits include commands to set up new character sets, also known as fonts. CHAN L (#n%,42) gives you the address of the first font used by window N% and that is a useful number if you want to change a few characters in a font but otherwise use the normal set.

The address of the standard fonts in a QL varies between versions and national editions but that does not matter if you use CHAN L to read it. It is better to use the information already in the system than to over-write it with your own.

You can be sure that national variations, other than your changes, will be handled automatically by programs which adapt to suit their environment. That is important on the QL because it is available in so many international versions.

Another issue is future compatibility. QLs and the first Thors always kept the display information at a fixed address, 131072. You could be sure that saving or loading 32K of memory at that address would save the display of any window.

The new Thor 16 is more flexible and can have several displays at different addresses. That is an advantage but it may confuse programs which always expect the display memory to be at 131072. If your program checks CHAN L (#n%,50) whenever it wants to know the start address of display memory it will be that much more future-proof.

Table 1.
Offsets for CHAN-L

0	Total length of details for this channel, in bytes
42	Start address of first character set
46	Start address of second character set
50	Start address of display memory

Table 2.
Offsets for CHAN-W%

24	Horizontal co-ordinate of left edge of this window
26	Vertical co-ordinate of top edge of this window
28	Width of this window
30	Height of this window in pixels
32	Border width
34	Horizontal position for next printing in this window
36	Vertical position for next printing in this window
38	Horizontal character spacing / width of the cursor
40	Vertical character spacing / cursor height in pixels

LISTING 1

```
* QL WORLD DIY TOOLKIT - CHAN functions
* Ver. 0.3, Copyright 1988 Simon N Goodwin.
*
start   lea.l   define,a1
        move.w  #110,a2         BP.INIT vector
        jmp     (a2)
*
define  dc.w    0,0             No procedures
        dc.w    3               Three functions
        dc.w    ch_byte-*
        dc.b    7,'CHAN_B2'
        ds.w    0
        dc.w    ch_word-*
        dc.b    7,'CHAN_W2'
        ds.w    0
        dc.w    ch_long-*
        dc.b    6,'CHAN_L'
        ds.w    0
        dc.w    0               End of functions
*
ch_long moveq   #-1,d5
        bra.s   get_params
ch_word moveq   #1,d5
        bra.s   get_params
ch_byte moveq   #0,d5
*
get_params lea.l 2*8(a3),a0
        cmpa.l  a0,a5           Two parameters?
        beq.s   two_params
bad_parm moveq  #-15,d0
bad_exit rts
*
two_params move.w #112,a2       Vector to get integers
        jsr     (a2)            CA.GTINT
        bne.s   bad_exit
        move.w  0(a1,a6.l),d0   Get BASIC channel number
        addq.l  #2,a1           Leave room for one INT
        move.l  a1,$58(a6)      Store maths stack pointer
        move.w  0(a1,a6.l),d1   Get offset
*
* Check and convert channel number in D0 to ID in A0
*
chan_sel  mulu  #40,d0          Channel table size
        add.l   $30(a6),d0      Add base offset
        cmp.l   $34(a6),d0
        bge.s   what_chan       Past end of table?
        move.l  0(a6,d0.l),d0
        bpl.s   chan_open       Negative if closed
what_chan moveq #-6,d0          CHANNEL NOT OPEN error
        rts
chan_open move.l d0,a0          A0 is channel ID
*
* Check offset for word values
*
        move.w  d5,d2           Copy flag for EXTOP
        beq.s   offset_ok
        btst    #0,d1           Test odd/even bit
        bne.s   bad_parm        Reject odd values
*
offset_ok lea.l ch_extop,a2     Address of routine
        moveq   #-1,d3          Allow infinite time
        moveq   #9,d0           SD.EXTOP key
        trap    #3
        tst.l   d0
        bne.s   bad_exit
        move.l  $58(a6),a1      Retrieve maths stack
        tst.w   d5              Check result size
        bmi.s   return_fp
*
return_int move.w d1,0(a1,a6.l) Put result in space
        moveq   #3,d4           Indicate type is INT
        rts                     Return EXTOP error code
*
* Convert long integer in D1 into a floating point value
*
return_fp move.w d1,d4          D4 will be exponent
        move.l  d1,d5           D5 will be mantissa
        beq.s   normalised      Zero is a trivial case
        move.w  #2079,d4        First guess at exponent
        add.l   d1,d1           Already normalised?
        bvs.s   normalised
        subq.w  #1,d4           No, halve exponent weight
        move.l  d1,d5           Double mantissa to match
        moveq   #16,d0          Try a 16 bit shift
*
normalise move.l d5,d1          Take copy of mantissa
        asl.l   d0,d1           Shift mantissa D0 places
        bvs.s   too_far         Overflow: must shift less
        sub.w   d0,d4           Correct exponent for shift
        move.l  d1,d5           New mantissa is more norma
too_far asr.w   #1,d0           Halve shift distance
        bne.s   normalise       Try shift of 8, 4, 2 and 1
*
* Check there's enough space for the result: (6-2) bytes
*
normalised move.l a1,$58(a6)    Record current A1 limit
        moveq   #4,d1           No. of extra bytes needed
        move.w  #$11A,a0        BV.CHRIX vector
        jsr     (a0)
        move.l  $58(a6),a1      Get safe A1 value
        subq.w  #4,a1
        move.l  a1,$58(a6)      Grab 4 more bytes safely
*
        move.l  d5,2(a1,a6.l)   Stack mantissa
        move.w  d4,0(a1,a6.l)   Stack exponent
        moveq   #2,d4           Floating point result
        bra.s   got_value
*
* CHANnel EXtended OPeration routine: reads channel data.
* D1.W is offset, D2 is a flag: 0=Byte, -ve=Long, +ve=Word
* The result is returned in D1; no errors are detected.
*
ch_extop tst.w  d2
        beq.s   read_byte
        bmi.s   read_long
read_word move.w 0(a0,d1.w),d1
        bra.s   got_value
read_long move.l 0(a0,d1.w),d1
        bra.s   got_value
read_byte moveq #0,d2           Clear high byte
        move.b  0(a0,d1.w),d2
        move.w  d2,d1
got_value moveq #0,d0
        rts
*
        end
```

DIY TOOLKIT

CONTINUED

The code for the channel access functions is listed in two forms. Listing two gives you a quick way to enter the code without using an assembler. It loads the equivalent machine code from DATA statements and saves the code in a file. Once you have loaded that file, as follows, you can use CHAN B%, CHAN W%, and CHAN L in your programs:

```
base=RESPR(262) : LBYTES "file name," base : CALL base
```

The first part of listing is Marcus Jeffery's standard loader, used in every month's DIY Toolkit project. Only the DATA, from line 590 onwards, changes from month to month.

Listing one is the assembly code program, assembled using HiSoft *DevPac*. You can type this text into your assembler if you want to customise the code or merge it with other routines.

The START routine calls BP.INIT, the ROM vector which adds new commands to SuperBasic. The table labelled DEFINE indicates that three new functions are to be added and gives their names and addresses.

Most of the code is shared between all three functions; when differences are required the program checks D5 which contains a flag which indicates whether a byte, word or long word is to be read. We choose D5 because it is very rarely corrupted by the operating system, so the value survives even if the subsequent code makes plenty of use of Qdos.

The first step is to make sure that we have two parameters. A3 and A5 point to the start and end of the parameter information, with eight bytes of data for each parameter. The easiest way to check for two parameters is to set a register we are not otherwise using to point 16 bytes past A3, and check that the result is the same as the value in A 5. That is better than adjusting the values of A3 or A5 directly, as we need them later. The check is performed by the five lines starting at GET PARAMS.

Then we read both parameters — the channel number and offset. Both are integers, so we call CA.GTINT to fetch them from the place indicated by A3 and A5. GTINT returns with a non-zero value in DO, signifying a 'bad parameter' or 'error in expression' if it cannot find two suitable values. Otherwise it puts them on the maths stack, pointed to by A1 offset from A6, with the first parameters at the lowest address on the stack. We copy the parameters to two registers, D0 and D1, once they have been read.

The code from CHAN SEL should be familiar to regular DIY Toolkit readers or extension writers. It converts a Basic channel number into an internal system identifier by looking through the SuperBasic table of channel details. If the identifier is negative or the entry would be outside the limits of the table, the code reports CHANNEL NOT OPEN.

Next we check the remaining parameter, the integer offset of the required information, measured from the start of the channel details. If we are reading words or long words this value must be even, as the 68000 family of processors will let us read word values only from even addresses. This rule means that QL programs will always run efficiently and compatibly on more powerful versions of the QL 68008 processor.

Channel block

The channel block always starts on an even address, as it begins with a long word value, so we need to check only whether the offset is odd or even. There is no check that the combination of size and offset you indicate corresponds to useful information but you can do no harm by reading values from odd places.

By the time we reach OFFSET OK the parameters have been checked and converted. We copy them to the registers expected by Qdos and call SD.EXTOP, the TRAP routine which lets us add new code to a display device. The TRAP converts the channel identifier in A0 into the address of the first documented part of the channel block. This operation ensures compatibility between different systems.

Then the system calls the routine pointed to by A2, our code which fetches a value from an offset address. The values of D1 and D2 are passed into this routine but D1 is the only data register which can be used to pass back information. The original value of D2 is re-instated when the call is complete.

If anything goes wrong, Basic will report the error indicated by the value in DO after the TRAP. The most likely error at this point is 'bad parameter,' which occurs if the channel is not a display channel. In this case SD.EXTOP is rejected by the device TRAP handler.

It is possible that another task is already using the channel, in which case Qdos cannot use SD.EXTOP immediately. If the value of the 'timeout' in D3 was zero, the system would give up at once and return an 'in use' error.

The design of the QL operating system Qdos means that only one task can use a particular channel at any time. If a second task tries to use a channel, even to read details, while another task is waiting for data from the channel, the second task will not be allowed access until the first has finished.

If the timeout value in D3 is -1, the system keeps trying to perform the operation every time tasks are swapped until it succeeds because the other task has finished using the channel. This is called an 'infinite' timeout, with good reason. If you expect to use those functions with shared channels you should choose the timeout value which best suits you. If all is well the call returns with zero in D0, to indicate no problems, and a result in D1. Bytes and words can be returned directly to Basic.

SuperBasic unfortunately does not let us return long word values without conversion. Long words, usually memory addresses, must be converted into floating point form. That is the only SuperBasic data type with sufficient resolution to return them accurately.

Floating point numbers are held in two binary sections. One, called the mantissa, holds the binary digits of the result, while the other, the exponent, records where the binary point is in the mantissa — in other words, the place where binary digits cease to represent whole units and start to represent fractions.

Normalised

The QL expects that floating point numbers are 'normalised' so that there are no leading zeros in the mantissa value. That means they always have the same precision and can be compared easily. If leading zeros were allowed they would have to be counted and taken into account whenever floating point numbers were compared. The sequence of normalised values can often be determined by checking the exponents, without even looking at the mantissa.

The routine NORMAL gets rid of the leading zeros quickly and simply. You will probably find this code useful in other extensions, as the QL ROM lacks a vectored routine to convert long integers into floating point form.

The obvious way to remove leading

zeros would be to keep shifting the number left until a digit fell off the end and then shift it back one place. This could take 32 shifts and checks, so it rather a slow process.

Instead, NORMAL uses large shifts at first and then tries steadily smaller ones until the number fits exactly. It can build the effect of 0-31 shifts by using or discarding the results of shifting by 16, 8, 4, 2, and 1 place. The mantissa is built in D5, with the exponent in D4. At first the routine assumes that the binary point is at the left-hand end of the mantissa and sets D4 to the conventional value to indicate this. D1 is used as a temporary store when the routine is trying to determine whether or not the mantissa needs shifting. If a shift does not cause an overflow the value of D4 is adjusted to reflect the new position of the binary point, nearer the left-hand end of the number. Otherwise the loop keeps trying smaller and smaller shifts until D5 must be normalised.

The code at NORMALISED calls BV.CHRIX, to check that there is sufficient room for the result on the maths stack. Floating point numbers occupy six bytes on the maths stack but two are already allocated for the offset, the last value we read. CHAN B% and CHAN W% re-use that space but a floating point result needs an extra four bytes.

It is vital to make this kind of check, or extensions — like VER$ on a JS QL — can crash the system by using memory allocated to them. It is also important to make sure you leave nothing allocated on the stack apart from the result or all kinds of weird things can happen.

These three functions will let you read most of the data in a channel block but they are little use for reading the current graphics co-ordinates and scale, held in six-byte floating-point form at offsets 74 (X), 80 (Y) and 86 (scale factor). As a simple exercise, try adapting this code to add a fourth function, CHAN F, which reads a floating point value from a channel. Very little new code is required.

Use −2 as the flag value in D5 for the new function and check that the exponent value read is between 0 and 4095. Values outside that range can occur if incorrect offsets are used and they will crash SuperBasic if they are passed on to calculations.

● *Next month there will be more code and commentary. If you would like me to explore a specific area, or implement new commands, particularly ones unavailable in commercial toolkits, send your suggestions.*

Table 3.
Offsets for CHAN-B%

66	Character attributes: this byte contains seven useful bits of information about character printing in this window. You can sift out each individual bit with the 'bitwise AND' operator '&&,' as follows: IF CHAN B% (#chan%,66) && 1 : Underlining on IF CHAN B% (#chan%,66) && 2 : Flashing on IF CHAN B% (#chan%,66) && 4 : Transparent background IF CHAN B% (#chan%,66) && 8 : Overprinting: OVER −1 IF CHAN B% (#chan%,66) && 16: Tall text: CSIZE ?,1 IF CHAN B% (#chan%,66) && 32: Extra width: CSIZE 1, 3 IF CHAN B% (#chan%,66) && 64: Double width: CSIZE 2, 3
67	Cursor status: 0 = OFF, 1 = flashing ON, 255 − flashing OFF
68	Paper colour, 0-255
69	Strip colour, 0-255
70	Paper colour, 0-255
72	Scrolling status: Zero means that there is room for another character to be printed without scrolling. Positive values mean the window is full; negative ones indicate that a new line character, CHR$(10), has been printed. so subsequent output must appear on the next line.

LISTING 2

```
100 REMark Sinclair QL World HEX LOADER
110 REMark by Marcus Jeffery & Simon N Goodwin
120 :
130 CLS
150 RESTORE : READ space : start = RESPR(space)
160 PRINT "Loading Hex..." : HEX_LOAD start
170 INPUT "Save to file...";f$
180 SBYTES f$,start,byte : STOP
190 :
200 DEFine FuNction DECIMAL(x)
210 RETurn CODE(h$(x))-48-7*(h$(x)>"9")
220 END DEFine DECIMAL
230 :
240 DEFine PROCedure HEX_LOAD(start)
290 byte = 0 : checksum = 0
300 REPeat load_hex_digits
310    READ h$
320    IF h$="*" : EXIT load_hex_digits
330    IF LEN(h$) MOD 2
340       PRINT"Odd number of hex digits in: "!h$
350       STOP
360    END IF
370    FOR b = 1 TO LEN(h$) STEP 2
380       hb = DECIMAL(b) : lb = DECIMAL(b+1)
390       IF hb<0 OR hb>15 OR lb<0 OR lb>15
400          PRINT"Illegal hex digit in: "!h$
410          STOP
420       END IF
430       POKE start+byte,16*hb+lb
440       checksum = checksum + 16*hb + lb
450       byte = byte + 1
460    END FOR b
470 END REPeat load_hex_digits
480 READ check
490 IF check <> checksum
500    PRINT"Checksum incorrect. Recheck data."
510    STOP
520 ELSE
530    PRINT"Checksum is correct"
540    PRINT"Data entered at: "!start
550 END IF
560 END DEFine HEX_LOAD
570 :
580 REMark Space requirements for the machine code
590 DATA 262
600 :
610 REMark Machine code data
620 DATA "43FA000A34790000","01104ED200000000"
630 DATA "0003002807434841","4E5F4225001A0743"
640 DATA "48414E5F5725000C","064348414E5F4C00"
650 DATA "00007AFF60067A01","60027A0041EB0010"
660 DATA "BBC8670470F14E75","3479000001124E92"
670 DATA "66F43031E8005489","2D4900583231E800"
680 DATA "C0FC0028D0AE0030","B0AE0034BC062036"
690 DATA "0B006A0470FA4E75","2040340567060B01"
700 DATA "000066C045FA0062","76FF70094E434A80"
710 DATA "66B4226E00584A45","6B083381E8007B03"
720 DATA "4E7538012A01671C","383C081FD2816914"
730 DATA "53442A0170102205","E1A1690498402A01"
740 DATA "E24066F22D490058","720430790000011A"
750 DATA "4E90226E00585949","2D4900582385E802"
760 DATA "3384E8007B02601A","4A42670E6B063230"
770 DATA "1000600E22301000","600B740014301000"
780 DATA "320270004E75","*",18242
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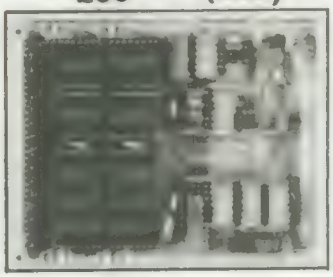

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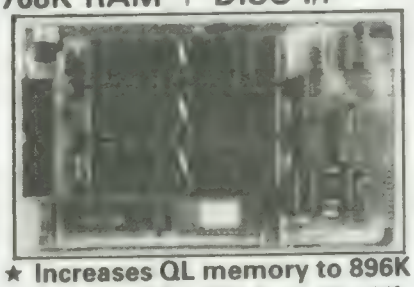

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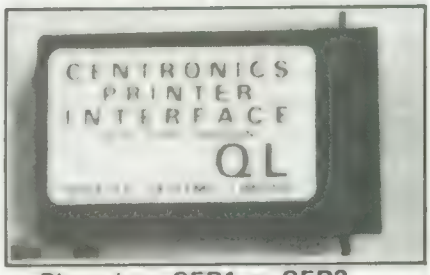

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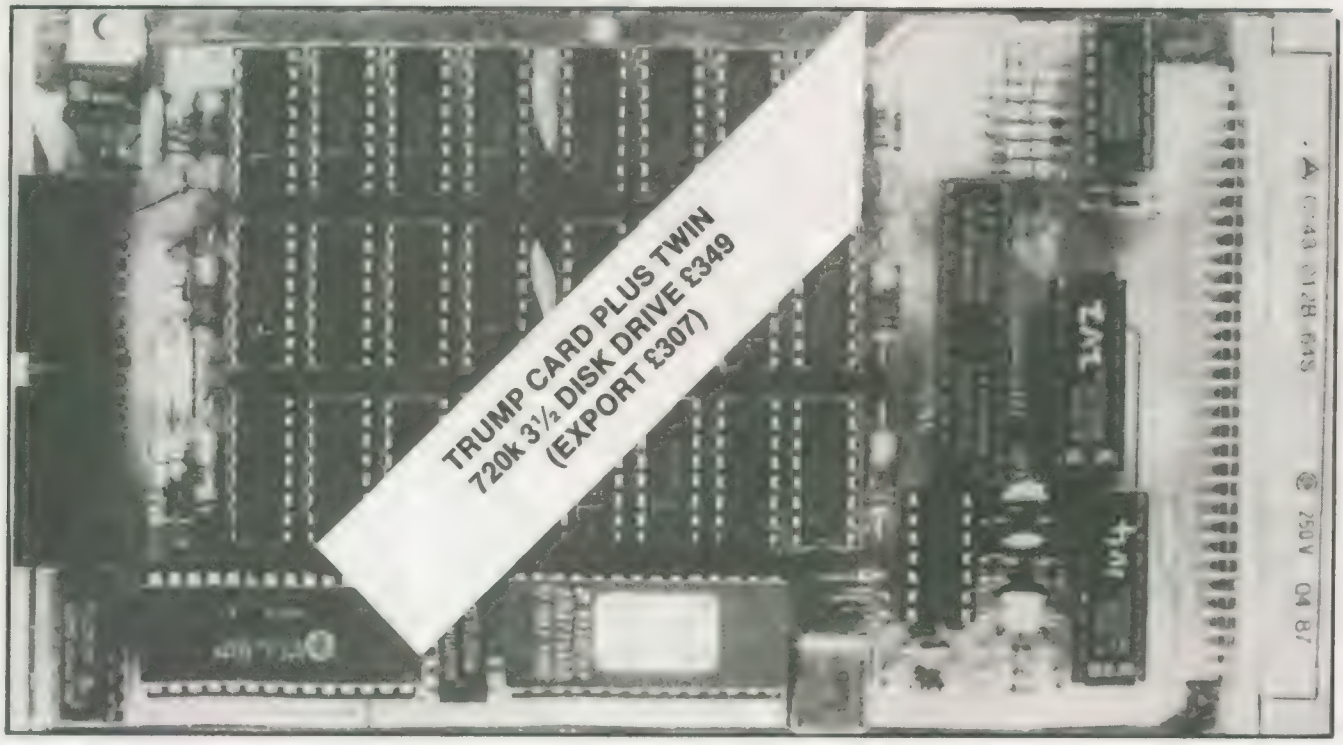

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Cue: Talker

Ron Massey listens to the newest speech synthesiser for the QL.

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Throughout history, mankind has had a pre-occupation with the concept of emulating all kinds of natural phenomena, from the flight of birds to reproducing colours found in nature. Occasionally, stunning successes have been made through the weight of unqualified persistence and usually in the face of unbelievable odds. One of those abstractions, the artificial reproduction of speech, is the subject of this report.

For centuries, countless attempts have been made to find a viable means of reproducing coherently the complex sounds made by the human voice. As usual, desire for progress far surpassed the technology of the day. As often happens under such conditions, over-enthusiasm often gave rise to a considerable amount of deception.

Even in early Roman and Greek history, religious institutions sought a means of producing artificial speech, thereby giving validity to oracular pronouncements. The first documented success occurred in 1779 in response to The Imperial Academy of St Petersburg offering a prize for a solution to any individual who could produce speech originated by a machine.

Winner of the award was Professor C. G. Kratzenstein, inventor of the vibrating reed resonator used in the harmonica. His device consisted of five manually-controlled resonant cavities, excited by vibrating reeds and reproduced successfully the controlled articulation of the vowel sounds A, E, I, O and U.

Twelve years later Wolfgang Von Kempelen improved and expanded on Kratzenstein's original concept and produced a bellows-driven device which was, with its constant supply of air passed through a vibrating reed, controlled by a hand-operated resonant cavity.

Legless

Von Kempelen was found guilty of deception when it was discovered that his latest "invention", a chess-playing automaton, concealed a legless Polish general in it.

Marking a major milestone in technology, Von Kempelen's device remained esentially unmatched and all subsequent attempts at speech synthesis copied the acoustical physics of the human speech tract in the manner of Von Kempelen's original concept.

The emergence of the electronics industry in the early 20th century opened new horizons, providing designers and researchers with a means of extending the scope of their endeavours. In 1939, a "talking" machine called the Voder made its debut as an exhibit at New York World's Fair, marking the first of what was to become many directions speech synthesis was to take.

The Voder diverged from previous approaches to synthesis by producing a broad band of noise electrically which was, coupled to a random noise generator, filtered electronically. Controlling the sounds was accomplished by a set of foot and hand controls and each word was produced by regulating the sound in real-time. That the process was extremely complex can be readily appreciated by the fact that an operator required a year's training to produce continuous, intelligible speech.

Speech consists of precise control over complex acoustic filtering. By adulthood, most of that control is an almost automatic function. A wide-band noise source is employed in the glottis, where the vocal chords vibrate under the controlled action of air expelled from the lungs.

Sound is modulated — regulated — by filtering the vibration excited in the cavity between the glottis and the lips, accentuating certain frequencies and modifying the sound in an articulate manner.

Essentially, the human speech mechanism consists of two resonators — the f vocal tract, from the glottis to the lips; a the nasal tract, each of which makes contribution to modifying the sounds produce while speaking.

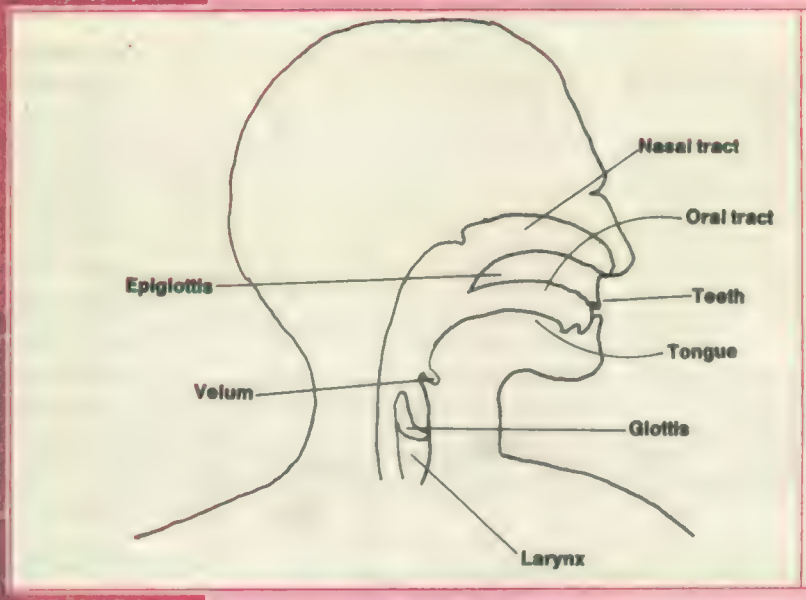
Of the two resonators, the mo important is the tract ending in the lip The nasal passage is used only for a fe sounds in the English language, mo notably n and m.

For the purpose of speech analysis an synthesis, elements of speech may b defined in two different but related ways:

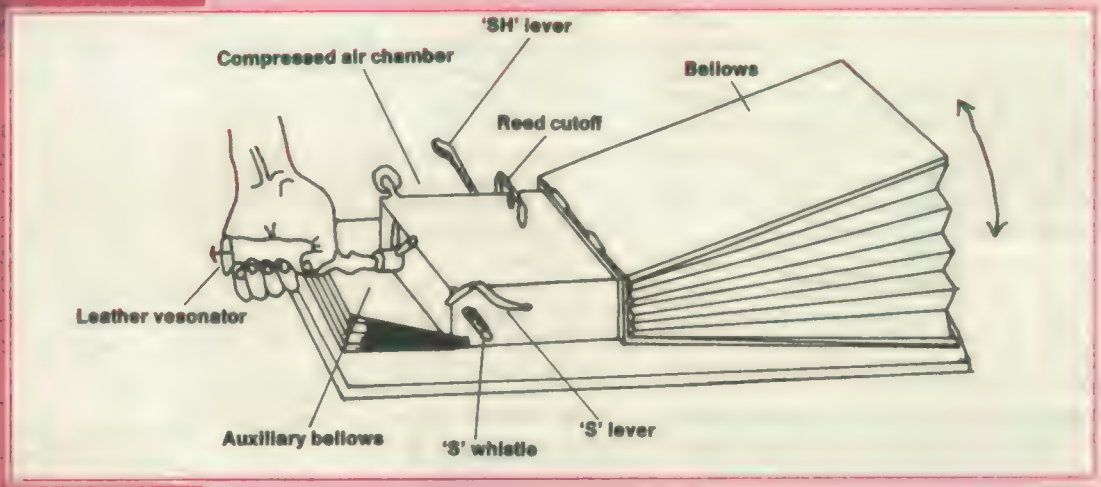
Phonemes — basic components speech sounds — may be analysed an synthesised subsequently by a machin and then called-up in required combina tions as needed, to translate a set instructions into the spoken word. It is th method which is used for speech synthesi systems on the QL and for most othe micros.

An exact classification of the precis types of sounds produced during th enunciation of a word depends on class fication of a number of parameters of given sound and include frequencies speed of reproduction, attack and decay volume and, in more sophisticate systems, inflection.

Frequency synthesis, as the process is



Top: The positions of human speech organs. A speech synthesiser has to imitate sounds made by this infinitely plastic flesh and blood — a tall order.



Bottom: Sir Charles Wheatstone's reconstruction of Van Kempelen's speaking machine.

called, necessitates an appreciation of the exact frequency structure of voice sounds. Speech is composed of a mixture of several basic frequencies in various proportions as a word is spoken. It is on this principle that highly-individualised control of sounds uttered form the basis for voice prints used in criminology.

For most of the practical computer applications, utilising frequency synthesis requires that analogue sounds be processed by an analogue-to-digital converter. The output of the converter, sampled at a uniform rate, is stored in digital format. The fidelity of the sound processed in this manner depends largely on the resolution produced by the sampling rate and almost always consumes a prodigious amount of memory.

The process of using phonemes is called phonetic synthesis and speech elements used by this method are split into four main components, with a fifth category for combination sounds.

Table 1. Classification of human speech.

Component	Sound	Example
VOICED	Continuous sounds, such as vowels, produced by the resonating glottis.	"a" — "*car*" "o" — "sn*ow*"
FRICATIVE	Hissing sounds, where the glottis is not required.	"s" — "*s*ound" "sh" — "*sh*ow" "h" — "*h*igh"
PLOSIVES	Short, sharp sounds.	"k" — "ca*k*e" "t" — "tha*t*"
LABIALS	Sounds generated at the lips.	"f" — "*f*ar"
COMPOUND	Combining more than one sound.	"th" — "*th*ing" Mixing the fricative "th" and a voiced sound.

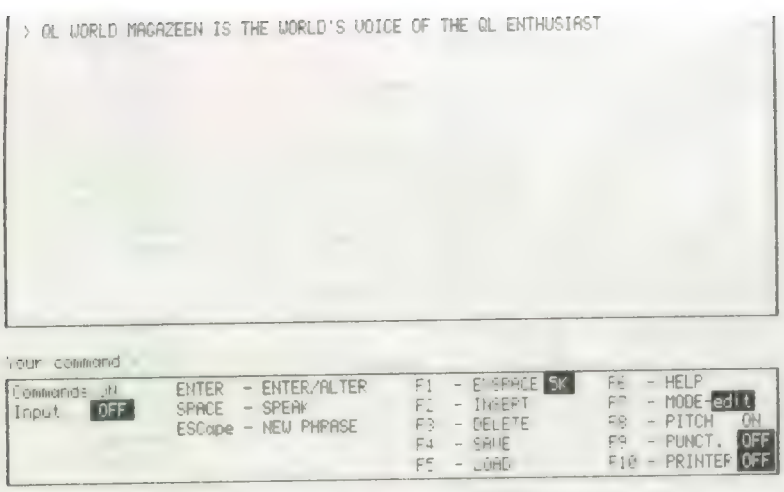
Sounds may be classified further by a number of sound units from which almost any word may be constructed.

Table 2. A few classifications of speech sounds comprising a mini-reference of allophones.

Type	Phoneme	Example
VOWELS	a	s*a*ke
	ae	s*a*nd
	ah	*a*nt
	aw	s*ou*ght
	e	b*ee*
	eh	*e*xtra
	er	weath*er*
PLOSIVE	b	*b*ought
	k	*c*rises
	t	*t*ank
FRICATIVE	h	*h*and
	sh	*sh*op
	th	*th*ought

Other categories include semi-vowels, as in *y*our, and nasals sounds, such as *m*a*n*y.

Peculiarities of speech often require a



Above: A typical screen from "PHRED". Author and machine work together on a basis of creative spelling.

phonetic library which can include a range of almost identical phonemes for similar sounds. One type may be used for initiating a word and another for its termination. Often the only real difference between such phonemes is in the timing of the sounds produced; one may be more compressed than the other.

Two talkers

Two speech synthesisers reviewed in *QL World* of January, 1987, were available for the QL at that time. The first, from Maurice Computers, plugged into the QL expansion port and was 'written' to with sentences constructed entirely of allophones — contextual variants of the same phoneme.

Typically, sentences constructed with the system looked sommething like:
"I am a computer", or: "AY1 PA4 AE1 MM1 PA4 EY1 PA4 KK1 AX1 MM1 PP1 YY1 UW1 TT2 ER2 PA1".

The PA allophones provided a means of inserting pauses of various lengths between sounds and words. Minute but perceptible pauses were also possible by inserting full-stops. By using other related allophones it was possible to alter the spoken word in very subtle ways.

Although initially a little difficult to work with, the Maurice system was fairly easy to master after a little practice and proved to be particularly flexible.

The second synthesiser reviewed at that time, *Talker,* was imported from the U.S. and connected to the QL serial 2 port. Complete words or sentences were printed to the port by opening a channel and using the QL PRINT statement directed to the channel. Pure text files could be copied from a drive to ser2 and Talker would read them is a Dalek-like accent.

A new voice synthesiser from the New Zealand firm of Maxtronics R&D, called *QTalk,* is housed in a 170mm. x 110mm. x 60mm. black box and incorporates all the electronics and speaker. Although performing the same job as its predecessors, superficially the QTalk system is flexible and has a number of useful applications.

Installing QTalk is simple. Remove the QL power cord, connect the QTalk power lead to the QL, plug the QL power pack into the socket provided in the QTalk case and connect the remaining lead to the QL serial 2 port.

Since QTalk is an RS232C device, it can operate on either DCE — the configuration in which it is supplied — or DTE. If you require the serial 2 port for your printer, it is possible to alter the input connections to QTalk inside its case to allow connection to the serial 1 port instead.

Systems like QTalk and Talker tend to suffer from the idiosyncracies of English pronunciation. Also limitations, imposed by the current scope of technology, restrict the range of distinctions between some combinations of letters and require that certain words be mis-spelt deliberately to get the pronunciation correct.

Talker pronounced "ware", as in "software", as "whar". That necessitated spelling the word as "softwhere". Other mis-spelling requirements can be visually humorous. Typical problem words are "read", which can be pronounced as "reed" or "red". To have a starting point, QTalk defaults to the "red" pronunciation and, incidentally, pronounces "software" with its correct spelling.

One of the illogical aspects of the pronunciation of English was highlighted by an example used in the QTalk manual. George Bernard Shaw once suggested that, as a means of standardising spoken English, ghoti should be pronounced fish. The suggestion was arrived at logically if one considers: *gh* = f (as in enou*gh*), *o* = i (as in w*o*men) and *ti* = sh (as in no*ti*on). QTalk, incidentally, pronounces ghoti as "fish".

QTalk differs from its predecessors in a number of important aspects. First, it can be used with sentences and the QL PRINT statement in the same way as Talker. Additionally, spelling can include or contain spelling fails to produce correct pronunciation. Five PA pauses, ranging from 10 milliseconds to 200 milliseconds, have also been provided.

Second, QTalk includes a provision for customising intonation with a range of 16 pitches, moving the quality of its spoken word somewhat further from the realms of Dr. Who. In addition to being provided with an unalterable table of rules for common pronunciation, QTalk is also provided with a default User Exception Table. If you use particular words often and do not wish to be compelled perpetually to mis-spell them — "mountain" is normally spelled "mountin" — you can construct your own list of words which forms the basis of a custom UET.

Five SuperBasic keywords are added to the QL repertoire and are used with the QTalk system:

SAY$ is a function which returns a string — i.e., character, word or sentence.

EXLOAD loads a previously-saved User Exception Table into memory.

EXSAVE saves the current User Exception Table.

EXSPACE (size) reserves memory for a word exception table.

ESDEL deletes a label from the User Exception Table.

EXINS inserts an entry into the User Exception Table.

I had most fun with EXINS. Syntax for this instruction is A = EXINS("Fred",SAY$("Harry"))

In this example, QTalk will substitute the word "Harry" for every occurrence of "Fred". If you do that kind of thing, devise a vocabulary framework consisting of emotive political phraseology and substitute the terms for words somewhat closer to their real-life meaning, as opposed to definition.

Guessing game

When you then produce eloquent scripts of the type used for speeches incorporating your words, the spoken word says what it really means. A fun extension of this principle is to devise a game in which a player's vocabulary is transmuted and the other players have to guess what the words should be.

More serious uses for EXINS include specialised pronunciation of particular words. A typical application includes situations where QTalk is used as a spelling or language aid. Since individual lessons will be confined to a relatively limited vocabulary framework, specific pronunciations can be assigned for particular lessons, mostly overcoming the "red"/"reed" problem.

The software supplied with the QTalk unit provides the five SuperBasic extensions used as a toolkit and a routine referred to in the instruction manual as *QTalking with Phred.*

Although it is easy to write a simple

SuperBasic program enabling you to type sentences and have them echoed to QTalk, Phred is a sophisticated program which will do that for you and much more. The Phred screen consists of three windows, the upper and largest of which is used for inputting sentences. The smallest middle window is your command line. Prompt and option status are enclosed in a window at the bottom third of the screen.

Once you have entered a phrase, pressing <SPACE> causes QTalk to say your phrase again. If you press <ENTER> instead, the cursor returns to the end of the phrase and you can then edit it. Function keys noted as <F1> through <F10> presumably for Thor users — the range on the QL to do the same job is <F1> through <F5> and <SHIFT> F1> through <SHIFT> <F5> — provide accessories to the Q Talk range of operations options.

F1 EXSPACE — QTalk U.E.T. data space.
F2 Insert
F3 Delete
F4 Save
F5 Load
F6 Help
F7 Mode (edit or echo)
F8 Pitch (On/Off)
F9 Punctuation (speaking — on/off)
F10 Printer (on/off)

Four expressions,, if used on their own, have reserved uses; CLS, Time — says the time; data — says the date; and Quit. Phred has been designed to provide maximum flexibility and a configuration program has been included so that you can set up a wide range of defaults for specific applications.

In addition to the usual drive defaults, you can also select options such as printer port, BAUD rate, input mode and whether you wish to have your printer, the QTalk pitch option and to have the punctuation spoken to default to on or off.

One of the features included with some of the other micros such as the Amiga is that they often include a built-in speech synthesiser. Games writers need only to hook into the system provided to include speech for added realism and player participation.

Maxtronic has released two games which take advantage of QTalk facilities. Although the games, *Alien Hijack* and *Puzzle Mania*, can be played without QTalk connected to your system, the added involvement of the spoken word is interesting. Other useful applications include a range of educational and other interactive programs.

Consistent with the continuing development of all good ideas, QTalk implementation is a marked improvement over all that has preceded it. Its provision for adjusting sound timings between individual characters and means for customising sounds to produce the spoken word is of particular importance. It seems that the next stage of hardware development for speech systems will be to integrate one of the many relatively inexpensive sound chips used for music synthesis into a speech synthesiser, giving the user almost perfect human speech, with total control over pitch, inflection, intonation and accenting.

As an extension to this approach and, since the output from QTalk is printed through the serial port, there would certainly be no reason why printer-type control codes could not be included for modifying specific voicing instructions so as not to clutter the typed copy unnecessarily.

QTalk has a number of valid applications, most notably in education, monitoring human activities and in fields where some degree of visual handicap is involved. Maxtronics states that it is willing to modify its software for specialised applications not catered for by its already flexible system.

Where a QL is incorporated into a monitoring or instrumentation system, QTalk can also be used to provide audible warnings, instructions or many other types of verbal interface. I feel Maxtronics deserves 10 out of 10 for its QTalk speech synthesiser implementation. Not only has it produced a useful piece of hardware but considerable thought has gone into making QTalk into a complete and flexible system is readily apparent.

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Nice for the PRICE

Lovely software, any one you like . . . Leslie Fahidy tots up two packages for the small business.

Originally, Sir Clive Sinclair envisaged the QL as a business computer. As we all know, for various reasons, the dream did not materialise on a grand scale but that does not mean that the QL is not capable of dealing with business computing tasks. One should not attempt to run a multi-national company on the QL. I would not encourage anybody to do so but it is an excellent machine for the small business user. This month we look at two software packages from SD Micro Systems of Hitchin, Hertfordshire, either of which would be a welcome addition to the armoury of anybody who wants to computerise business operations. Both packages will run on the unexpanded QL but, naturally, they will also run with any expansion such as extra memory and/or disc drive(s).

Both items of software are such that you could produce results just as useful by programming Archive, which is available free to every QL owner. The question is, however, whether or not you have the necessary knowledge to do so and whether you can spare the time.

The package consists of two Microdrive cartridges, labelled A and B, and a manual. The software is written in Basic, though that was not evident from the speed of execution; it loaded fairly fast and executed at a convenient speed. Cartridge A contains the main program; the utilities and some of the minor routines are contained on cartridge B. I have experimented with the software on an unexpanded QL, mainly to confirm the statement of SD Microsystems; the program runs satisfactorily on a basic machine.

Version 2.2 is an enhanced version of a previous release; the enhancements ensure more convenient use but the principles of operation are substantially the same.

Once the program is started the master menu is displayed on the screen. Generally, the system works with a series of related menus and sub-menus. The master menu gives 10 choices — sales and purchase ledger, mailing list, stock control, billboard display, label designer, unit conversion routine, telephone directory, file utility and a routine marked clone. A rather primitive but effective four basic functions-only calculator is also available. The routine named clone is for the purpose of backing-up, either the original cartridges or data cartridges.

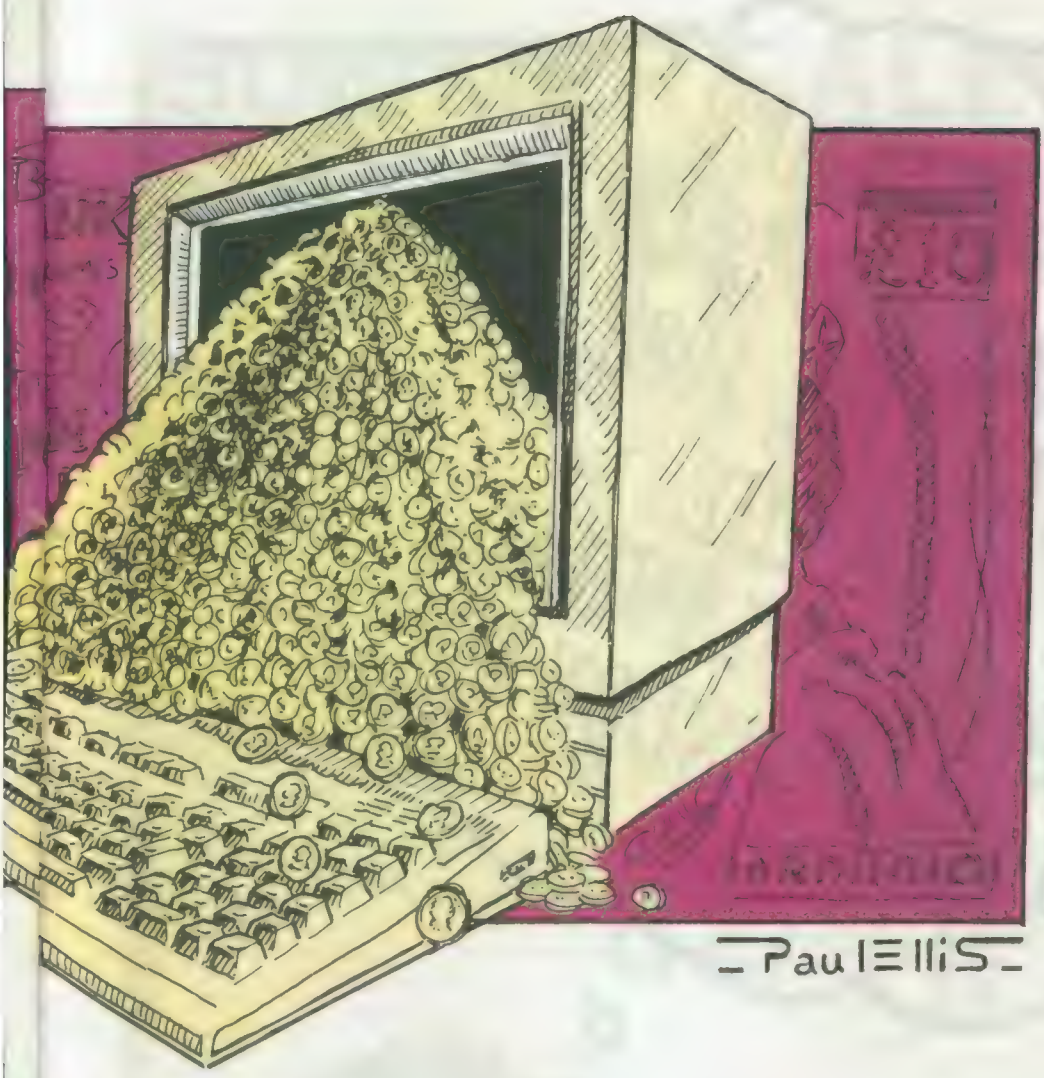
The sales and purchase ledgers will each hold 450 accounts; they are intended to run in conjunction with a manual system to produce cashflow and credit analysis procedures. Each of the ledgers is envisaged to hold data for the transactions in one month and with that limitation in mind the 450 possible entries are likely to be sufficient for small to medium-sized organisations.

Both ledgers can produce figures for VAT returns. I found this feature particularly useful, since I know from the experience of some of my clients that the forms are the source of regularly-recurring headaches. The added facility of resetting the VAT rate is also welcome.

A question also arises in connection with a possible change in VAT rates. How would those figures be treated by the software which occurred before the change? I feel that the simplest way would be to start a new data file on the appropriate date.

The mailing list is, according to the manual, limited to 200 entries, containing the usual fields for names, addresses, titles and so on. According to the display, however, there is sufficient space for only 180 such entries. For a small organisation that figure might be sufficient but only the user can decide. It is, of course, always possible to use several data files, one for two or three letters of the alphabet say. The mailing list, apart from a display on the screen, will also output to the printer; it will print on address labels either one or two across, with facilities for adjusting the output to suit the dimensions of the label.

Generally, printer output is available to Epson-compatible printers. Should you wish to use a different type all is not lost, since the QL may be set up for virtually any printer and the printer driver may be recorded on the cartridge. I made this last statement tongue in cheek; I remember trying to set up the QL to work with a Brother EP 44. That, how-



ever, is not a criticism of the software — just a statement of fact.

The stock control section will deal with 500 items and all necessary fields are there, though I would have liked to see fields for the supplier's name and address. On the plus side, there is a welcome additional facility — a field for a sort code. It is a single-character field, enabling the user to report on all stock items from a particular supplier, or to list different ranges of stock separately.

Apart from various utilities, there is a telephone list for 100 entries and a billboard routine. I feel that many small traders with a window display will find the billboard facility very useful.

It enables you to set up various messages and/or advertising slogans and display them in a shop window, one message at a time, for a given duration. Needless to say, you will be able to use all the character sizes of which the QL is capable.

There is no doubt that the *Small Trader's Pack* is not so strong on features as some you may buy for some more fashionable business machines but you do not pay the same price for it either.

Software: Sales Invoice Pack
Supplier: SD Microsystems, PO Box 24, Hitchin, Hertfordshire. Tel: 0426 675106
Price: £19.95 — if purchased separately; £9.90 — if purchased with Small Trader's Pack. Inclusive of VAT, postage and packing

This package is similar in concept and in the general principles of operation to the Small Trader's Pack. When loaded, the screen displays the master menu giving the choice of processing the sales ledger or statements or generating invoices. File utilities and the mini calculator are still available as before, so is the routine CLONE, to back-up either data files or the distribution software.

The sales ledger is identical to the section similarly named in the first item of software; in fact, the sales ledger from the Small Trader's Pack may be used instead.

The main purpose of the software is the generation of invoices and that may be achieved in two ways. The user may either enter the data by hand — useful for the one-off invoice whose data, for some reason or another, has not been included in the sales ledger. Alternatively, the invoicing section may take its data from the ledger. Either way, separate entries are provided for cash and credit sales, with a facility for entering the receipts when the credit sale customers have paid their accounts. Similar to the previous item of software, a reasonably-detailed VAT report is available. Apart from invoices, the routine will also generate credit notes, an important consideration in the day-to-day running of many businesses.

Just as the QL is not intended to carry-out the computing tasks of a giant organisation, nor are these two examples of business software, but within that limitation I feel confident that owners of small and medium businesses of many descriptions will find it useful. It is among the cheaper offerings in this line. From the point of view of value. I am convinced both programs are worth the price.

Naturally, it is always possible to pick up points in any software which the reviewer would have liked to see done in a different way. I, too, have such points but I do not think it would be fair to criticise the software on the grounds of personal likes and dislikes. There is one criticism, though, which goes further than personal preferences and I think that SD Microsystems would do well to heed it.

I am not entirely happy with the screen presentation of inputting data. All fields are limited to a certain number of characters, which is understandable, but there is no indication on the screen of the number of characters permitted. The authors could either draw a small box round the expected input or occupy those character positions by a reverse video display, or any one of a number of other possible methods, to indicate the expected size of the field.

With those small reservations I would recommend to all interested parties the acquisiation of these two items of software.

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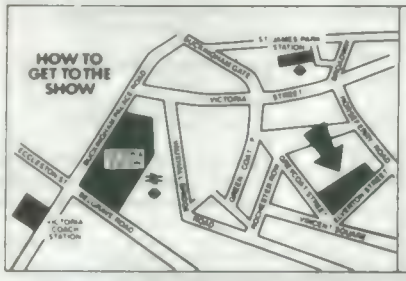

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SOFTWARE FILE

Product: *Alien Hijack.*
Supplier: Strong Computer Systems, Bryn Cottage, Peniel, Carmarthen, Dyfed, SA32 7DJ.
Tel: 0267 231246.
Price: £18.26, inclusive of VAT and postage.

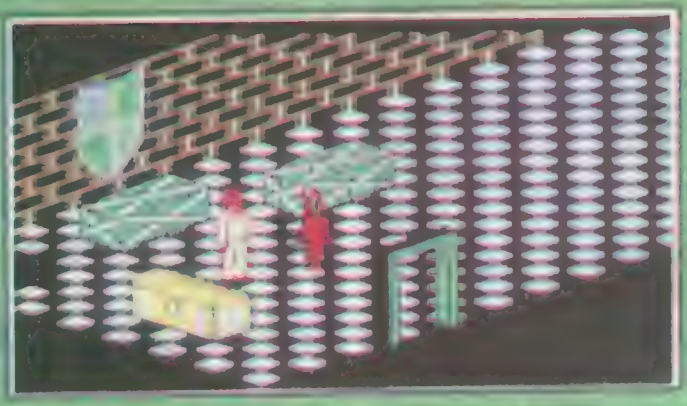
Both of the games reviewed in the present edition of Software File are exceptional in that they can be used either in a standard QL or, if the hardware is available, with the Maxtronics *QTalk* speech synthesiser.

The first game, *Alien Hijack*, is a three-dimensional maze-type graphics adventure. The year is 2003 and you are aboard the S.P.C Forward in your capacity as ship's engineer. Strange things have happened on-board and you remember, with increasing nervousness, the legendary disasters associated with the Bermuda Triangle.

Your goal is to regain control of your ship and, at the same time, avoid or destroy any aliens attempting to stop you. Complicating play further, you have to find keys before you can open some of the doors.

In addition to mazes, corridors and obstacles, some of which are red herrings, you must find three codes which, together, form the shape of an anchor. The screen is divided into two panels; the uppermost is the game display and the lower one a status panel in which your energy and power level in the power pack for your blaster is displayed continually. Four windows indicate the items you are carrying according to the type of item you have discovered. If you find the three codes they are displayed in their own windows.

You are also provided with an information panel



Alien Hijack — in the chequered linoleum tradition.

in which you can control the character's movement either by walking — the default — or running, shooting at the aliens, taking or dropping items you collect along the way.

The concept is entertaining. I felt that, having a vocal interface available, it could have been used more effectively; the screen prompts are spoken, as are the dying gasps of the adversaries you shoot.

Games for other machines which include vocal participation, most notably the Amiga *Goldrunner*, provide narration of encouragement and occasional warnings to the player.

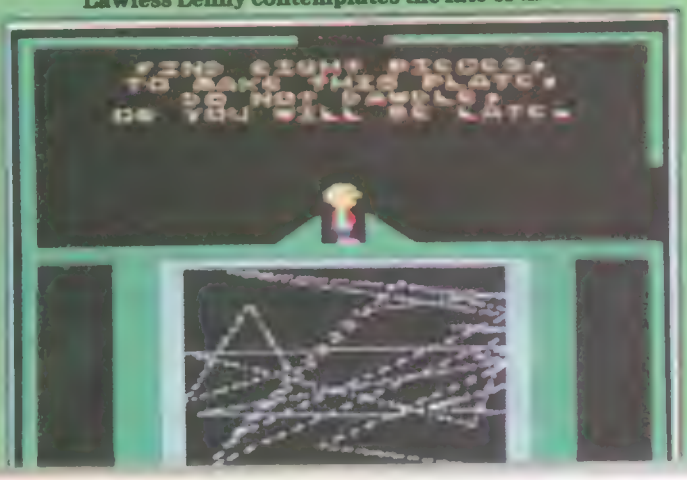
I was left with the feeling that the Hijack graphics speed was its only weak point. While it was obviously not intended to compete with the frantic speed of arcade-type action, movement round the screen felt a little sluggish.

Be that as it may, it is well-thought-out, highly-addicitive and, with its 192 screen locations, guaranteed to keep you busy at the game of survival. The cribsheet printed on the reverse side of the packaging label makes the suggestion that you map out your game on successive plays; in the light of experience it is a very good suggestion.

Product: *Puzzle Mania.*
Suppliers: Strong Computer Systems, Bryn Cottage, Peniel, Carmarthen, Dyfed, SA32 7DJ.
Tel: 0267 231246.
Price: £12.50 inclusive of VAT and postage.

Lawless Lenny is the star turn in the second Maxtronics QTalking adventure, *Puzzle Mania*. When first started, you are standing over a square pit which fills with eight column of apparently spurious design. Pressing <ESC> at this point returns you to the starting screen and you are offered a different design with which to play.

Lawless Lenny contemplates the fate of the late.



To complete the game successfully you must visit the numerous screens to collect eight articles — up to two in any single foray — in the correct order, return to the pit and drop them into the opening at the top. At the same time you must also avoid moving obstacles and exhausting your energy.

Since your energy level is not displayed it is recommended that you top up at a battery when and where you find one, provided you have depleted some of your energy. If you attempt to gain energy without needing it your energy level will be reduced. Failure to observe the two "simple" precautions will cost you one of your six lives. When you have re-deposited the eight items successfully you will be suitably rewarded.

The first two games to be released taking advantage of the added dimension of vocal interaction between QL and player, using the Maxtronics *QTalk* are, in their own right, very entertaining to play and, not surprisingly, produced by the makers of QTalk.

Overall, Maxtronics has provided both the occasional and dedicated games player with two very good products. Both are decidedly replayable. I find greater appeal in games containing elements of playing within a maze and therefore found Hijack more addicitive than Mania but both games have their attractions.

Like so many innovations, Maxtronics has aptly demonstrated that game narration is not only desirable but simple to implement.

A WORD FROM DIGITAL PRECISION LTD

It is common knowledge in the QL community that Tony Tebby is the author of the QL's operating system and of Supertoolkit, a product which we have always recommended and continue to recommend. There were compatibility difficulties on some QLs between Supercharge (as distinct from Turbo) and Supertoolkit, which were mitigated by the use of our program foolkit—task/zampnames—task, and which were referred to in the documentation accompanying Turbo. We wish to point out that:

1 It is not our contention that these incompatibilities were the fault of Tony or Supertoolkit. Any implication that the responsibility was Tony's or Supertoolkit 's is both unintentional and regretted.

2 We have only respect for the competence of Tony Tebby whose skill was already acknowledged elsewhere in the Turbo documentation. We apologise unreservedly to Tony Tebby and regret any upset to him and his family and any damage to his reputation.

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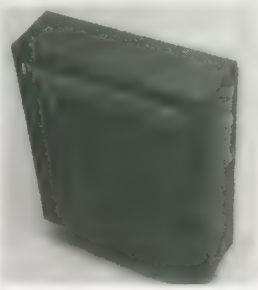

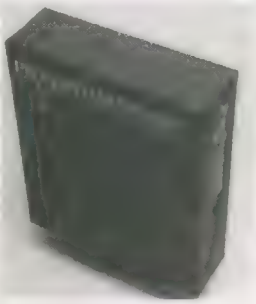

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THE PROGS

If you have a program worthy of consideration, send it to 'The Progs', Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG. We pay for everything published at the usual page rates.

Program of the month

DOMINOES by ADRIAN STEEN

This simulation of *Dominoes* is for one player to play against the computer. The rules are simple; each player matches the number on one end of the domino with the number on the 'free' end of the previous player's domino. The winner is the player with the fewest dominoes remaining when no more pieces can be played.

After loading the game from Microdrive, a title screen will be displayed, followed by a 15-second wait. During the wait the computer does a number of calculations to reduce time delays during gameplay.

After the playing screen has been drawn you will see your dominoes at the bottom of the screen. You can play any domino by typing-in the number on either end, in the required order. If the last domino played was 2 . . 3 and you have 5 . . 3 left to play, you would enter 3 . . 5 to make the domino match.

The game must start with either you or the computer playing double six and the winner is the one to play all the dominoes first. In the event of neither player being able to finish, the winner will be the one with the fewest dominoes remaining.

During the game if you cannot place a domino, enter x x to pass.

```
1 REMark ** DOMINOES by A.STEEN 8/9/87**
2 REMark **        For QL WORLD         **
3 :
4 REMark **      Initialisation         **
5 MODE 4
6 WINDOW #1,512,256,0,0
7 PAPER #1,0
8 CLS #1
9 WINDOW #1,448,200,32,16
10 WINDOW #2,448,200,32,16
11 PAPER #1,0
12 INK #1,7
13 PAPER #2,0
14 INK #2,7
15 CLS
16 RESTORE
17 count=0
18 win_flag = 0
19 aa = 0
20 uu = 0
21 hh = 40
22 d = 0
23 c = 0
24 DIM dom (56)
25 DIM a$ (28,2) , b$ (28,2) , c$ (28,2)
26 REMark ** read domino positions **
27 REPeat loop
28   READ dom (count)
29   count = count + 1
30   IF count = 55 THEN EXIT loop
31 END REPeat loop
32 :
33 REMark ** display title screen **
34 titscreen
35 :
36 REMark ** display instructions **
37 REPeat loop
38   key$ = INKEY$
39   IF key$ <> "" THEN EXIT loop
40 END REPeat loop
41 IF key$ = "y" OR key$ = "Y" THEN instru
ct
42 :
43 CSIZE #0, 2, 1
44 PRINT #0 , "              Please Wait..."

45 CSIZE #0 , 0 , 0
46 FOR a = 0 TO 6
47   FOR b = 0 TO c
48     d = d + 1
49     a$ (d) = a & b
50   END FOR b
51   c = c + 1
52 END FOR a
53 :
54 FOR a1 = 1 TO 8
55   c = 0 : d = 0
56   FOR a =1 TO 28
57     b =INT (2* RND (1) + 1)
58     IF b=1 THEN
59       c=c+1
60       b$(c) = a$(a)
61       GO TO 64
62     END IF
63     d = d + 1 :c$ (d) = a$ (a)
64     a$ (a) = ""
65   END FOR a
66   a = 0
67   FOR b= 1 TO c
68     a = a + 1
69     a$ (a) = b$ (b)
70   END FOR b
71   FOR b= 1 TO d
72     a = a + 1
73     a$ (a) = c$ (b)
74   END FOR b
75 END FOR a1
76 b = 0
77 FOR a = 1 TO 28
78   b$ (a) = "" : c$ (a) = ""
79   IF a/2 = INT(a/2) THEN
80     c$(a/2) = a$(a)
81     GO TO 85
82   END IF
```

PROGS

```
83    b = b + 1
84    b$ (b) = a$ (a)
85    a$ (a) = ""
86  END FOR a
87  FOR a = 1 TO 14
88    c1$ = c$ (a) (1 TO 1)
89    c2$ = c$ (a) (2 TO 2)
90  END FOR a
91  c9$ = "                  "
92  sd = 14 : bd = 14
93  CLS #0
94  CLS
95  CSIZE 0,0
96  FOR a = 1 TO 37
97    INK 7
98    PRINT "-" ;
99    INK 2
100   PRINT "-";
101 END FOR a
102 PRINT
103 INK 4
104 PRINT TO 60;"I HAVE"
105 PRINT TO 60;"14 DOMINOES"
106 INK 7
107 FOR a = 1 TO 37
108   INK 7
109   PRINT "-" ;
110   INK 2
111   PRINT "-";
112 END FOR a
113 PRINT
114 INK 7
115 grid
116 AT 13, 0
117 FOR a = 1 TO 37
118   INK 7
119   PRINT "-";
120   INK 2
121   PRINT "-";
122 END FOR a
123 INK 7
124 mess$ = "Your Dominoes"
125 AT 19,(74-LEN(mess$))/2 : PRINT mess$
126 REMark ** display player's dominos **
127 rem_doms
128 :
129 c = 14 : b = 14
130 be$ = "6"
131 FOR a = 1 TO 14
132   c1$ = c$(a)(1 TO 1)
133   c2$ = c$(a)(2 TO 2)
134   IF c1$ = "6" AND c2$ = "6" THEN
135     GO TO 139
136   END IF
137   IF b$(a) = "66" THEN GO TO 208
138 END FOR a
139 IF aa = 28 OR sd=0 THEN
140   sd=0
141   bd=5
142   GO TO 268
143 END IF
144 GO SUB 185
145 INK 4
146 PRINT "Which Domino ?       ";
147 INK 7
148 FOR a = 1 TO 2
149   REPeat loop
150     key$ = INKEY$
151     IF key$ <> "" THEN EXIT loop
152   END REPeat loop
153   PRINT key$;"  ";
154   a$ (a) = key$
155 END FOR a
156 :
157 IF a$(1)="x" AND a$(2)="x" THEN
158   GO TO 281
159 END IF
160 IF a$(1)<"0" OR a$(1)>"6" THEN
161   GO SUB 185
162   GO TO 139
163 END IF
164 IF a$(2)<"0" OR a$(2)>"6" THEN
165   GO SUB 185
166   GO TO 139
167 END IF
168 FOR a = 1 TO 14
169   c1$ = c$(a) (1 TO 1)
170   c2$ = c$ (a) (2 TO 2)
171   IF aa > 0 THEN GO TO 175
172   IF a$(1)<>"6" OR a$(2)<>"6" THEN
173     GO TO 182
174   END IF
175   IF a$(1)=c1$ AND a$(2)=c2$ AND c1$=b
e$ THEN
176     GO TO 193
177   END IF
178   IF a$(1)=c2$ AND a$(2)=c1$ AND c2$=b
179     GO TO 199
180   END IF
181 END FOR a
182 GO SUB 185
183 GO TO 139
184 :
185 CURSOR 1,0
186 PRINT
187 PRINT TO 50
188 CURSOR 1,0
189 PRINT
190 PAUSE 30
191 RETurn
192 :
193 REMark ** read screen pos **
194 aa = aa + 1: READ t1, t2, t3, t4
195 AT t1, t2 : PRINT c1$
196 AT t3, t4 : PRINT c2$
197 c$(a) = c9$ : be$ = c2$
198 GO TO 205
199 REMark ** read scr pos (backwards) **
200 aa = aa + 1 : READ t1, t2, t3, t4
201 AT t1, t2 : PRINT c2$
202 AT t3, t4 : PRINT c1$
203 c$(a) = c9$ : be$ = c1$
204 :
205 sd = sd - 1 : uu = 0
206 rem_doms
207 GO TO 216
208 aa = aa + 1 : READ t1, t2, t3, t4
209 INK 4: AT t1, t2 : PRINT "6"
210 AT t3, t4 : PRINT "6"
211 INK 7
212 b$ (a) = "xx"
213 be$ = "6"
214 bd = bd - 1
215 GO TO 139
216 IF aa=28 OR bd=0 THEN
217   sd=5
218   bd=0
219   GO TO 268
220 END IF
221 GO SUB 185
222 INK 4
223 PRINT "My set is      ";
224 INK 7
225 FOR a = 1 TO 14
226   b1$ = b$ (a) (1 TO 1)
227   b2$ = b$ (a) (2 TO 2)
228   IF be$ = b1$ THEN GO TO 238
229   IF be$ = b2$ THEN GO TO 248
230 END FOR a : GO SUB 185
231 INK 4
232 PRINT "PASS !!!!!!!!!"
233 INK 7
234 PAUSE 50
235 IF uu = 1 THEN  GO TO 268
236 uu = 1
237 GO TO 139
238 aa = aa + 1
239 READ t1, t2, t3, t4
240 INK 4
241 AT t1, t2 : PRINT b1$
242 AT t3, t4 : PRINT b2$
243 INK 7
244 b$(a) = "xx"
245 bb$ = b1$ & "  " & b2$
246 be$ = b2$
247 GO TO 257
248 aa = aa + 1
249 READ t1, t2, t3, t4
250 INK 4
251 AT t1, t2 : PRINT b2$
252 AT t3, t4 : PRINT b1$
253 INK 7
254 b$ (a) = "xx"
255 bb$ = b2$ & "  " & b1$
256 be$ = b1$
257 AT 1, 21 : PRINT bb$
258 bd = bd - 1
259 bd$ = bd
260 IF LEN(bd$) < 3 THEN
261   bd$ = " " & bd$
262   GO TO 260
263 END IF
264 INK 4
265 AT 2, 59 : PRINT bd$
266 INK 7
267 PAUSE 50 : GO TO 139
268 IF sd > bd THEN win_flag = 1
269 IF sd < bd THEN win_flag = 2
270 IF sd = bd THEN win_flag = 3
271 game_over
272 REPeat loop
273   key$ = INKEY$
274   IF key$ <> "" THEN EXIT loop
275 END REPeat loop
276 IF key$ = "y" THEN
277   CLS
278   GO TO 16
279 END IF
280 PAPER 0 : CLS : STOP
281 FOR a = 1 TO 14
282   c1$ = c$ (a) (1 TO 1)
283   c2$ = c$ (a) (2 TO 2)
284   IF c1$=be$ OR c2$=be$ THEN GO TO 287
285 END FOR a
286 GO TO 290
287 GO SUB 185
288 INK 4:PRINT "You CAN go !!":INK 7
289 PAUSE 50 : GO TO 139
290 IF uu = 1 THEN GO TO 268
291 GO TO 216
292 :
293 DEFine PROCedure instruct
294   CLS
295   CLS #0 : INK 7
296   CSIZE 1,1
297   AT 1,18:PRINT "Rules Of The Game";
298   OVER 1
299   AT 1,18 : PRINT "_________________"
300   OVER 0
301   CSIZE 0,0
302   INK 7
303   PRINT
304   PRINT "The aim of the game is to pla
y all your dominoes in as few move as"
305   PRINT "possible.  When it is your go
, try to match one of your dominoes with t
he"
306   PRINT "previously placed one.  To la
y a domino, just type in the two numbers"
307   PRINT "on the domino.  If you cannot
 go type 'xx'."
308   PRINT:PRINT "Double six starts..."
309   col = 0
310   REPeat loop
311     AT 18, 25:PRINT "Press Any Key To
Begin"
312     INK col
313     col = col + 1
314     IF col = 8 THEN col = 0
315     IF INKEY$ <> "" THEN EXIT loop
316   END REPeat loop
317   INK 7
318 END DEFine instruct
319 :
320 DEFine PROCedure grid
321   REPeat loop
322     READ a , b
323     IF a = 999 THEN EXIT loop
324     c = b + 6
325     d = a + 6
326     LINE a,b TO a,c TO d,c TO d,b TO a
,b
327   END REPeat loop
328 :
329 END DEFine grid
```

PROGS

```
330 :
331 REMark ** data player's rem **
332 DATA 15,11,15,14,15,18,15,21,15,25,15,
28,15,33,15,35,15,40,15,43,15,47,15,50,15,
54,15,57
333 DATA 17,11,17,14,17,18,17,21,17,25,17,
28,17,33,17,35,17,40,17,43,17,47,17,50,17,
54,17,57
334 REMark ** grid layout **
335 DATA 0,70,6,70,14,70,20,70,28,70,34,70
,42,70,48,70,56,70,62,70,70,70,76,70,84,70
,90,70,98,70,104,70,112,70,118,70,126,70
336 DATA 126,64
337 DATA 126,55,120,55,112,55,106,55,98,55
,92,55,84,55,78,55,70,55,64,55,56,55,50,55
,42,55,36,55,28,55,22,55,14,55,8,55
338 DATA 8,45,8,39
339 DATA 16,39,22,39,30,39,36,39,44,39,50,
39,58,39,64,39,72,39,78,39,86,39,92,39,100
,39,106,39,114,39,120,39
340 DATA 23,19,29,19,39,19,45,19,55,19,61,
19,71,19,77,19,87,19,93,19,103,19,109,19,1
19,19,125,19
341 DATA 23,9,29,9,39,9,45,9,55,9,61,9,71,
9,77,9,87,9,93,9,103,9,109,9,119,9,125,9
342 DATA 999,999
343 :
344 :
345 REMark  ** print positions **
346 DATA 5,1,5,3,5,7,5,10,5,13,5,16,5,20,5
,22,5,26,5,29,5,32,5,35,5,39,5,41,5,45,5,4
8,5,51,5,54,5,58
347 DATA 6,58
348 DATA 8,50,8,55,8,51,8,48,8,45,8,42,8,3
9,8,36,8,32,8,30,8,26,8,23,8,20,8,17,8,13,
8,11,8,7,8,5
349 DATA 10,5
350 DATA 11,5,11,8,11,11,11,14,11,17,11,21
,11,23,11,27,11,30,11,33,11,36,11,40,11,42
,11,46,11,49,11,52,11,55
351 :
352 REMark ** disp player's doms **
353 DEFine PROCedure rem_doms
354   count = 4
355   REPeat loop
356     AT dom (count-4) , dom (count-3) :
 PRINT c$ (count/4) (1 TO 1)
357     AT dom (count-2) , dom (count-1) :
 PRINT c$ (count/4) (2 TO 2)
358     count = count + 4
359     IF count > 56 THEN EXIT loop
360   END REPeat loop
361   CLS #0
362 END DEFine rem_doms
363 :
364 REMark ** game-over message **
365 DEFine PROCedure game_over
366   IF win_flag = 1 THEN text$ = " I am
the winner.... Maybe you'll win next time
!!! "
367   IF win_flag = 2 THEN text$ = "  You
are the winner this time...WELL   DONE....
... "
368   IF win_flag = 3 THEN text$ = "
   No - one won.... It was a fair draw !!
!"
369   CSIZE 1,0
370   count = 19
371   scrol 56, count, "                6
A  M  E     O  V  E  R"
372   scrol 56, count, text$
373   scrol 56, count, "          Do you w
ant another game ????? (Y/N)     "
374 END DEFine game_over
375 :
376 REMark ** scroller routine **
377 DEFine PROCedure scrol(col,row,text$)
378   text$ = text$ & " "
379   FOR loop = 1 TO col
380     AT row  , col - loop: PRINT text$
(1 TO loop)
381   END FOR loop
382 END DEFine scrol
383 :
384 REMark ** display title screen **
385 DEFine PROCedure titscreen
386   CSIZE 3,1
387   count = 0
388   count1 = 2
389   text1$ = "DOMINOES"
390   text2$ = "DOMINOES"
391   REPeat scroll_loop
392     INK count1
393     IF count>0 THEN text2$="  "&text1$
394     scrol 20 , count , text2$
395     text1$ = text2$
396     count1 = count1 + 2
397     count = count + 1
398     IF count1 = 8 THEN count1 = 2
399     IF count = 10 THEN EXIT scroll_loo
p
400   END REPeat scroll_loop
401   PAUSE 20
402   scrol 20,9, "Written by Adrian Steen
."
403   PAUSE 40
404   scrol 20,9, "For QL WORLD ..........
."
405   PAUSE 40
406   scrol 20,9, "Do You Require ...."
407   PAUSE 20
408   scrol 20,9, "Instructions ? ( Y/N )"
409   INK 7
410 END DEFine titscreen
```


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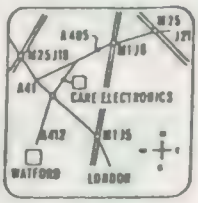

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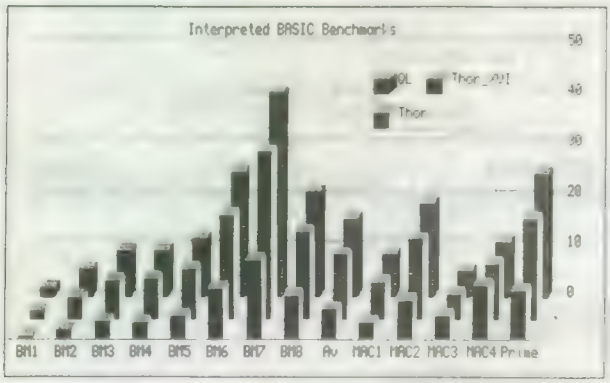
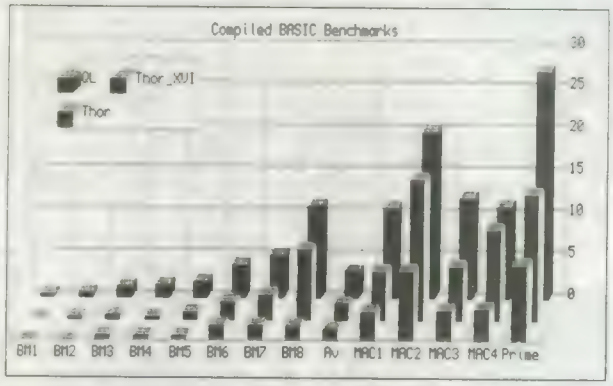
THOR XVI BENCHMARK RESULTS

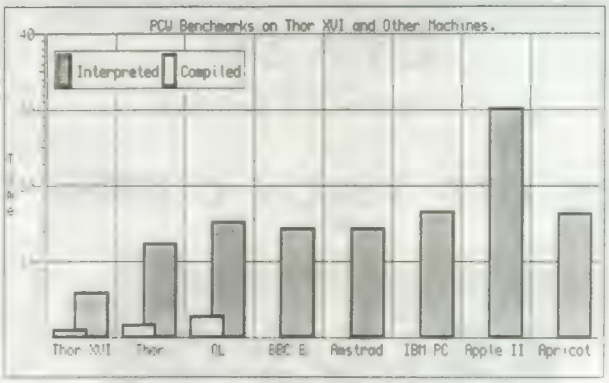




In the front row the Thor XVI timings leave the standard Thor and QL behind on the BASIC benchmark tests

"There are lies, demned lies and benchmarks" to mix metaphore. They are, at worst, only a test of how good a machine is at performing benchmarks. The oft-quoted PCW benchmarks actually test the speed of Basic interpreters running a set of somewhat unrealistic programs. This means that the test is at least as dependent on the performance of Basic (running badly written code) as the machine itself. However, when the computers being compared are of similar architecture and running essentially the same dialect of Basic (as with the QL, Thor and Thor XVI), the comparisions are quite meaningful.

The benchmark results shown here are as tested by CST for the QL and Thors; the other results are derived from results determined by QUANTA; these are given in good faith, but without any warrantee of accuracy. The multi-machine comparisons are for the average result from the PCW benchmarks. The QL v Thor benchmarks are for each of the PCW results, plus the performance of several Apple "Macintosh" benchmarks and a "sieve of Eratosthanes" prime number generator



The Thor-XVI: QL results show a speed ratio for interpreted SuperBASIC of 2.44:1.20:1.00. The results for compiled SuperBASIC (using Digital Precision's Turbo Charge compiler) are 2.25:1.38:1.00.

The multi-machine results show that the QL compares reasonably with considerably higher priced competition, with the Thor XVI way ahead. On this graph, the compiled versions of the benchmarks are shown to scale, showing the advantages of Turbo Charge. Compiled results for other machines were not available at the time of press unlike using Turbo, not all machines have compilers compatible with their interpreter (if any).

CST CONTACT QL FRANCE

With direct scales to France increasing all the time CST are investigating setting up a distribution network to look after the French language interests in Europe. With the intention of increasing cooperation a representative of CST attended a meeting of the French QL user group, QL CONTACT recently, also talking to members of the French speaking Belgian and Swiss groups.

HARDWARE SUPPORT

In particular language and compatibility worries were raised, however with QL CONTACT now evaluating a Thor XVI it is hoped any teething troubles can be eradicated with direct sales soon to follow. Preliminary negoiations have also taken place with Mr Alain Thomas, head of S.E.D.T. to give the necessary hardware support Thomas's company already handle QL hardware problems in France.

Dear Hilde . . .

Hilde has been shocked by readers response to last months caption competition In particular she has been snowed under with letters complaining of the flippant attitude towards what is apparently a serious problem in computer circles. While Hilde assures me she will make every endeavour to answer all your queries, she says there is no substitue for professional medical advice. Finally she reminds me that the competition closing date is th e 31st May. The intimate nature of Hilde's correspondence this month makes it unsuitable for publication. Photographs will only be returned with a stamped addressed envelope.

THOR TIMES
AGONY AUNT

ADDRESS FOR OUR FRENCH READERS

The QL user group:
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Next Month: Thor XVI Communications

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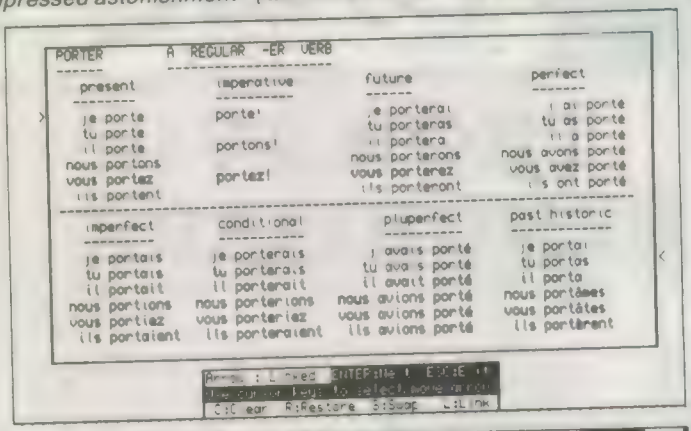

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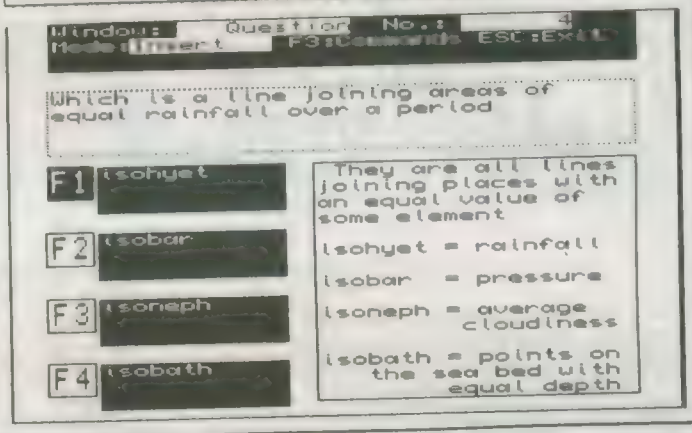

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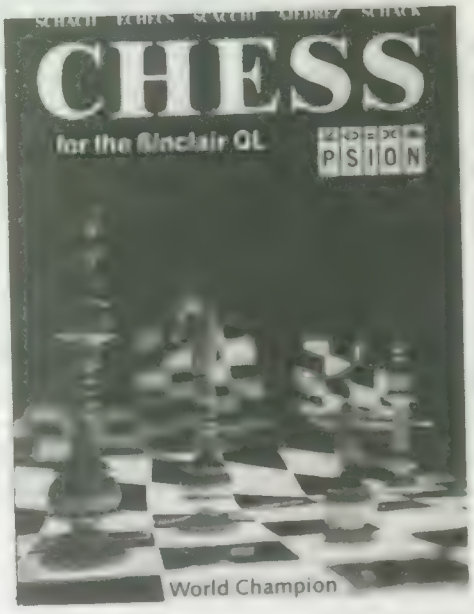

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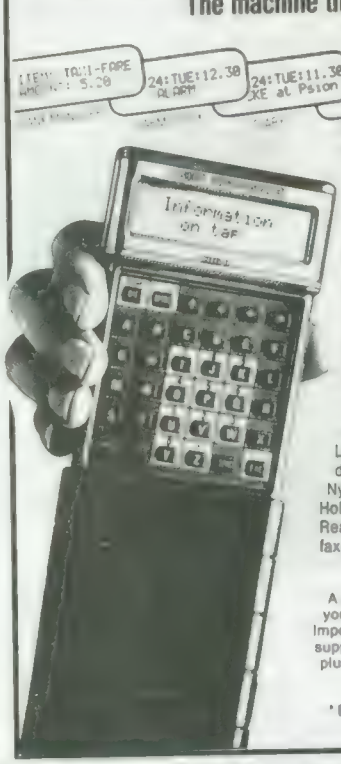

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7. Steve Deary — B — **Pacman** — £1

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8. Andy Carmichael — B — **Family Tree** — £3

An Archive program and database for setting-up and displaying large family trees. See Theory of Relativity, *QL User*, July and August 1985.

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9. James Lucy — L — **Composer** — £3

Completed in *QL User*, October 1985, this QLiberated program will allow you to compose, play and edit music. The program will handle sharps, vary tempo, and specify staccato and legato playing styles.

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17. Tony Quinn — S — **CAD QL** — £4

CAD design programs are particularly suited to the QL. This version includes rubber-banding and a user-definable symbol library. *QL World*, September 1988.

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19. Karl Jeffrey — M + B — **Starport 2001** — £3

Fast machine code action in this version of the *Galaxians* arcade game. *QL World*, November 1986.

24. J F Tydeman — S — **Design 3D** — £4

3D screen designs with the minimum of fuss and aggravation. *QL World*, March/April 1987.

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25. D Carmona — B — **Stellaris** — £4

This is an extensive real-time space adventure game against the computer, including economic simulations, lunar landing and superb graphics. *QL World*, June 1987.

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29. Peter Etheridge — B — **Bridge** — £4

An excellent version of this popular card game. Features include accurate computer bidding, automatic or manual play, replay hands, correct scoring, save and load positions and more.

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32. Phillip Sproston — B — **Advent2** — £4

SuperBasic arcade adventure with a humorous slant. A variety of rooms, robots and problems will keep you on your toes. Full instructions included.

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33. Leslie Fahidy — B — **Clock** — £3

This is a complete version of the clock program, described in the June and July 1987 issues of our QL Education series. an on-screen clock can be used to set or read the time.

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34. E Bamber — **QL Converson/ Calculator** — £2

Weights and measures units, conventions and reverse Polish calculation, this utility will convert almost anything to anything. Completely menu-driven, it is very easy to use.

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35. John Wakefield — B — **Qwhist** — £3

Designed for one player (south) who partners a computer hand (north) against the computerised east and west opponents. *QL World*, August 1987.

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36. Stanley Sykes — B — **Mail Merge** — £1

This cartridge contains very handy utilities providing a mail merge and labeller for Quill files. Includes a demonstration.

---

37. P G Ives — B — **The Double** — £4

A large strategy game in which you manage a football team through four league divisions; features buying and selling, team line-up, morale, and so on, through the league and F.A. Cup season. Includes full instructions.

EXCHANGE

READY TO RUN SOFTWARE

KEY							
	B	=	SuperBasic	A+B+O	=	Assembler and Basic Loader and Object Code
	A+O	=	Assembler and Object Code	S	=	Supercharged
	M+B	=	machine code and Basic Loader	L	=	QLiberate

38. Leslie Fahidy — B — Education — £2

As part of our series of educational programs, this is designed to help teach the solution of simple linear equations. It is aimed specifically at the 11-plus age range.

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39. J F Tydeman — S — Design 3D — £4

A large suite of graphics and filing utilities for the production of 2D and 3D graphics, with instructions in the form of a Quill document. *QL World*, March 1987.

---

40. Santiago Rubio — B — Roulette — £3

A Spanish/English version of the traditional gambling game; includes the Leigh Pattern, a system to break the bank. *QL World*, September 1987.

---

41. Leslie Fahidy — B — Money — £2

An educational shopping expedition, calculating prices from shopping lists and trying to determine what coins you will receive as change.

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42. Neil Davidson — A + B + O — Life — £2

A machine code version of the classic simulation of a colony of living cells which survive, reproduce or die according to mathematical rules. Quill instructions included.

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43. Alan Glassbrook — S — Ian Swinton Qsquidge — £2

An arcade hunt through an 8x8 grid expandable series of rooms for the nine parts of Squidge's rocket. *QL World*, October 1987.

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44. David March — B — Compress — £2

Utility to compress SuperBasic program files into a more compact form without losing the structure of the program.

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45. Ronnie Davidson — M + B — SuperBreakout — £2

A fast machine code version of the classic wall game where, using a bat and ball, you must try to break through the wall of bricks. Optional double bats and/or balls.

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46. Norman Marks — B — Navigator — £2

To calculate the distance and direction for travel between longitude and latitude positions on the Earth. The program includes an expandable list of locations. The calculation formulae can be seen from within the program.

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47. Richard Clements — B — 3D Maze — £2

Chase round the generated maze, shown in three dimensions, searching for the key to the next level before going through the exit. Extra points can be gained by passing over Point Squares but do not be carried away because it is all against the clock.

---

48. Jason Price — B — Yahtzee — £2

The popular dice game. On-screen graphics make the two-player program enjoyable and easy to use. *QL World*, November 1987.

---

50 Jay Lewington — B — Bank — £4

A menu-driven program to keep track of a number of bank accounts, including credits and debits, dated standing orders, printed statements and more.

---

51. A Didcock — B — Perspective — £1

Space is big. This program aims to prove it, with a graphical guided tour of the earth, the solar system, neighbouring suns, galaxy and the whole of creation.

THE ALL-NEW MICRODRIVE EXCHANGE

Microdrive Exchange has always been a popular feature of *Sinclair QL World* and in our constant efforts to improve the magazine we are expanding the Exchange to bring you even more quality programs at budget prices.

To achieve those results we have altered the format of the Exchange. Rather than calculating the number of sectors required by each program and sending the appropriate number of cartridges, we have now made it a one-program, one-cartridge system. So if you would like, say four programs, then regardless of length you will need four cartridges.

There are a number of advantages to the system. First, the service will be much faster, because programs can be copied in advance. Second, rather than having to ensure having the article for documentation we will be able to supply Quill documents on the Microdrive, if needed for future programs.

Finally, for all new programs on the Exchange, rather than just receiving the machine code version, the Supercharged version or whatever, we will be able to supply assembly listings, hex loaders and original Super Basic versions on the same cartridge, so that you can look at and amend programs.

Naturally this service will require the transfer of more than the usual number of Microdrives but bear in mind that the number of Microdrives you send will be returned with the software. We have reduced the price of Microdrives to £2 per cartridge.

With the new system, we have started to include programs which have not necessarily been featured in the magazine, either because they were too long or because we already had too many listings. Consequently we are now looking for quality programs of any length to feature in Microdrive Exchange. If you have any programs which you feel are good enough please send them for review.

See over page for order form

52. Simon Quinn — M + B — **Space Pods** — £3

A machine code arcade game. Your lone ship must protect six central energy pods against marauding aliens. *QL World*, December 1987.

---

53. S M Walker — B — **Graphic Writer** — £2

A graphic design program. In addition to the usual design commands, your picture can be saved as a series of SuperBasic commands for use in programs. *QL World*, December 1987.

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54. L Miles — M + B — **Zapman** — £3

This fast-action, machine code game is of the classic *Pacman* genre. Variable skill levels and a wide variety of maze formats will keep your interest high.

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55. Alan Pemberton — B — **Adventure Playtime** — £3

An extensive adventure where you must complete tasks for the inhabitants of a strange and unusual land. A Quill document gives details of the possible commands and some help in the form of a series of coded messages.

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56. Paul Mckinnon — M — **Space Invaders** — £3

A very fast, very challenging version of one of the best-known arcade games. Includes Quill instructions, ugly descending aliens and protective shields.

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57. Timo Salmi — B — **Spelled** — £3

A complete spelling checker. The system works on Quill —its files, checking them against its dictionary of more than 7,500 words. The dictionary can be expanded automatically as new words are found. This program requires a 512K expansion and occupies two Microdrive cartridges.

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58. Nigel Ford — B — **Radar** — £2

As Control, you must monitor a radar, watching the skies, acknowledging aircraft, scrambling jets to intercept UFOs, lining your sights and shooting down enemy aircraft.

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59. Geoffrey Evelyn — B — **Dungeons** — £4

As Wizard, Mega-Hero, Super-Hero or Elf, you must explore the *Dungeons*, fighting monsters and collecting treasure in this expansive one- to four-player game. Requires two Microdrive cartridges. For expanded QLs only.

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60. William Henderson — B — **Speed Mind** — £3

Based on the old Master Mind game played with coloured pegs, the game gives you 12 attempts at breaking the code, and times your guesses. *QL World* January 1988.

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61. A. Quigly — M — **Compander** — £1

A utility which compresses screen designs into the smallest files we have seen for any similar routine. *QL World*, April 1988.

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62. Adrian Steen — B — **Dominoes** — £2

This version of the classic English dominoes game is to play against the computer. For all ages. *QL World*, May 1988.

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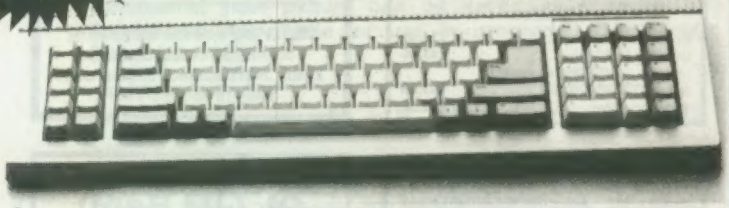

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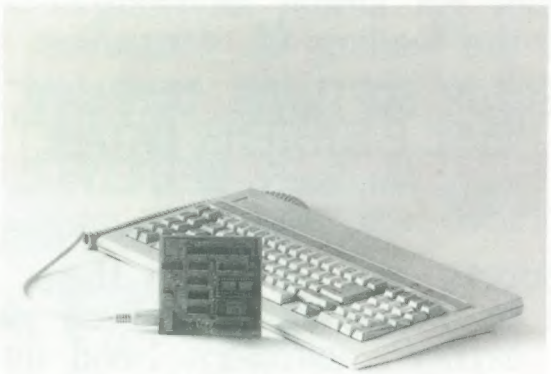

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SCROLL LOCK	CTRL F5

NUM LOCK toggles the state of the NUMLOCK LED.

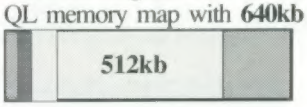
This controls the function of the numerical pad. Is NUMLOCK on, then a keypress on it generates the numbers and characters shown at the keys, otherwise

ARROW KEYS	CURSOR CONTROL
HOME	Cursor to start of line (in editors only)
END	Cursor to end of line (in editors only)
PAGE	UP Scroll up one page (in editors only)
PAGE	DOWN Scroll down one page (in editors only)
DEL	Delete character under cursor
INS	ALT ENTER (with SuperToolkit II)
CTRL -	program slow down
CTRL +	program speed up
SYSREQ	Job-change (function of CTRL C)
CTRL PRTSC	toggles MODE 4 and MODE 8
ALT SHIFT SYSREQ	Level 7 interrupt (CTRL ALT 7 at the QL)
PRTSC	s.u.
ALT SHIFT PRTSC	RESET

The Giga Soft MEGA-RAM

Thanks to the MEGA-RAM Card it is now possible to use more than **640kb** on the **QL** Computer. MEGA - RAM is a Board that replaces the orginal **68008** CPU and can handle up to **3 MB**. The new CPU on the MEGA-RAM Card is fully compatibel to the **68008** CPU. The command "ramex" makes the additional memory available for use - the normal RAM up to **640kb** can then be used as a RAM Disk. Up to **2MB** it is possible to use the orginal QL case. For the **3MB** Version a new case is required.

QL memory map with **640kb** RAM



QL memory map with the Giga Soft MEGA -RAM

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The Giga Soft IBM-Keyboard Interface	**£ 45**	**DM 229,-**		
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QLW5

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